



EPA 821-R-09-007

Technical Support Document for the Annual Review of Existing Effluent Guidelines and Identification of Potential New Point Source Categories

U.S. Environmental Protection Agency

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October 2009

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1. INTRODUCTION

Under the Clean Water Act (CWA), EPA establishes national technology-based regulations known as effluent guidelines and pretreatment standards to reduce pollutant discharges from categories of industry discharging directly to waters of the United States or discharging indirectly through publicly owned treatment works (POTWs). The CWA sections 301(d), 304(b), 304(g), and 307(b) require EPA to annually review these effluent guidelines and pretreatment standards.

This document supports EPA's 2009 review of its existing effluent guidelines and pretreatment standards. It also presents EPA's evaluation of categories of indirect dischargers without pretreatment standards to identify potential new categories for pretreatment standards, as required under CWA sections 304(g) and 307(b). Currently there are 56 point source categories that have effluent guidelines and pretreatment standards, which include over 450 subcategories. Additionally, CWA section 304(m) requires EPA to biennially publish an effluent guidelines program plan and provides for public notice and comment on such plan. Therefore, this document also supports the Preliminary 2010 Effluent Guidelines Program Plan (Preliminary 2010 Plan). Included in the Preliminary 2010 Plan is a solicitation for comments and data on industry categories currently not subject to effluent guidelines that are discharging non-trivial amounts of toxic or non-conventional pollutants.

EPA's annual review of effluent guidelines and pretreatment standards has several components. First, EPA reviews all industrial categories subject to existing effluent limitations guidelines and standards to identify potential candidates for revision, as required by the CWA sections 304(b), 301(d), 304(g) and 307(b). The findings of this review are discussed in Section 7 of this report and are called the screening level analysis. Second, EPA reviews direct discharging industries not currently subject to effluent limitations guidelines and standards to identify potential candidates for effluent limitations guidelines development, as required by section 304(m)(1)(B) of the CWA. Finally, EPA reviews indirect discharging industries not currently subject to pretreatment standards to identify potential candidates for pretreatment standards development, as required by section 307(b).

In conducting a screening level analysis, EPA uses readily available information from the Toxics Release Inventory (TRI), the Permit Compliance System (PCS), and the Integrated Compliance Information System for the National Pollutant Discharge Elimination System (ICIS-NPDES) to estimate the magnitude and relative toxicity of discharges from these industrial wastewater discharges. Section 1 discusses how EPA uses Standard Industrial Classification and North American Industrial Classification System codes to relate these discharge data to the 56 point source categories. EPA estimates the relative toxicity of these pollutant discharges in terms of toxic-weighted pound equivalents (TWPE). EPA estimates TWPE based on toxic weighting factors, which are discussed in detail in Section 5. EPA also uses available data to estimate discharges of pollutants in pounds, such as nutrients. For its 2009 review, EPA used information as reported to TRI, PCS, and ICIS-NPDES for 2007. EPA used 2007 data because these were the most recent TRI data available at the time it began the 2009 annual review. EPA used 2007 PCS and ICIS-NPDES data to reflect the same reporting year. EPA's 2009 screening level review is similar to that used for previous annual reviews (U.S. EPA, 2004; U.S. EPA, 2006; U.S. EPA, 2008). EPA used the 2009 review to confirm the identification of the three industrial categories prioritized for further review in the Final 2008 Effluent Guidelines Program Plan (73 FR 53218,

September 15, 2008) and to list the industrial categories currently regulated by existing effluent guidelines that cumulatively comprise 95 percent of the reported hazard (reported in units of TWPE) for preliminary category reviews.

This report describes the development of the databases that EPA used in conducting its 2009 screening-level analysis. This report is a companion report for the *Technical Support Document for the Preliminary 2010 Effluent Guidelines Program Plan* (U.S. EPA, 2009). It also presents the results of the 2009 screening-level analysis. The remainder of this report is divided into the following sections:

- Section 2 - Development of *TRIReleases2007*;
- Section 3 - Development of *DMRLoads2007*;
- Section 1 - Identification of Point Source Categories;
- Section 5 - Toxic Weighting Factors (TWFs);
- Section 6 - Quality Review; and
- Section 7 - Results of 2009 Screening-Level Analysis.

Section 7 provides a summary of the TWPE calculated from the TRI data and PCS/ICIS-NPDES data. EPA used the combined TWPE from the 2007 TRI and PCS/ICIS-NPDES data to prioritize its review of industry sectors that offer the greatest potential for reducing hazard to human health or the environment.

1.1 Introduction References

1. U.S. EPA. 2004. *Technical Support Document for the 2004 Effluent Guidelines Program Plan*. EPA-821-R-04-014. Washington, DC. (August). EPA-HQ-OW-2003-0074-1346 through 1352.
2. U.S. EPA. 2006. *Technical Support Document for the 2006 Effluent Guidelines Program Plan*. EPA-821-R-06-018. Washington, DC. (December). EPA-HQ-OW-2004-0032-2782.
3. U.S. EPA. 2008. *Technical Support Document for the 2008 Effluent Guidelines Program Plan*. EPA-821-R-08-015. Washington, DC. (August). EPA-HQ-OW-2006-0771-1701.
4. U.S. EPA. 2009. *Technical Support Document for the Preliminary 2010 Effluent Guidelines Program Plan*. EPA-821-R-09-006. Washington, DC. (October). EPA-HQ-OW-2007-0571 DCN 06703.

2. DEVELOPMENT OF *TRIReleases2007*

As discussed in Section 1, EPA annually reviews promulgated effluent limitations guidelines and pretreatment standards (ELGs) by investigating available information on industrial pollutant discharges. EPA identified that the Toxics Release Inventory (TRI) contains readily available and relevant data on industrial pollutant discharges, specifically that TRI data has information on industrial pollutant discharges to surface waters (“direct discharges”) and to publicly owned treatment works (POTWs) (“indirect discharges”). Consequently, EPA was able to use TRI data for its review of: (1) promulgated effluent guidelines (“direct discharges”); (2) promulgated pretreatment standards (“indirect discharges”); and (3) direct and indirect industrial pollutant discharges not currently subject to effluent guidelines or pretreatment standards. As discussed in Section 7, EPA combined the toxic-weighted pound equivalent (TWPE) calculated from the TRI data and the discharge monitoring report data contained in the Permit Compliance System (PCS) and the Integrated Compliance Information System for the National Pollutant Discharge Elimination System (ICIS-NPDES) (see Section 3 for information about PCS and ICIS-NPDES). EPA used this combined TWPE to prioritize its review of industry sectors that offer the greatest potential for reducing hazard to human health or the environment.

This section discusses the methodology EPA used to create *TRIReleases2007*, a database created by the EPA to analyze 2007 TRI data. It also presents the unweighted annual pollutant load (i.e., pounds) and the relative toxicity of these discharges using toxic weighting factors (TWFs) (i.e., TWPE) for all facilities reporting discharges to TRI for the year 2007 and for the point source categories that these facilities represent. Tables A-1 and A-2 in Appendix A present the annual pollutant load and TWPE from *TRIReleases2007* on a six-digit North American Industrial Classification System (NAICS) code and chemical basis, respectively. This section is organized in the following subsections:

- Section 2.1 – General TRI information;
- Section 2.2 – Overview of TRI databases;
- Section 2.3 – *TRIRawData2007*;
- Section 2.4 – *TRICalculations2007*;
- Section 2.5 – *TRIReleases2007*;
- Section 2.6 – *TRIReleases2007*; and
- Section 0 – *TRIReleases2007* References.

2.1 TRI

TRI is the common name for Section 313 of the Emergency Planning and Community Right-to-Know Act. Each year, facilities that meet certain criteria must report their releases and other waste management activities of listed toxic chemicals (i.e., the quantities of toxic chemicals recycled, collected and combusted for energy recovery, treated for destruction, or disposed by the facility). A separate report must be filed for each chemical that exceeds the reporting threshold. For the 2009 annual review of effluent guidelines, EPA used data for reporting year 2007, because they were the most recent data available at the time the review began. The TRI list of chemicals for reporting year 2007 includes more than 600 chemicals and chemical categories. Prior to 2006, facilities were required to identify their operations using Standard Industrial Classification (SIC) codes. Starting with reporting year 2006, EPA modified

the requirement for facilities to report SIC codes, so that facilities now use the NAICS code (73 FR 324666).

A facility must submit a TRI report if it meets the following three criteria (U.S. EPA, 2001):

1. **NAICS Code Determination:** Most facilities in NAICS codes 11, 21, 22, 31 through 33, 42, 48 through 49, 51, 54, 56 and 81, and federal facilities are potentially subject to TRI reporting. EPA generally relies on facility claims regarding the NAICS code identification. The primary NAICS code determines if TRI reporting is required. The primary NAICS code is associated with the facility's revenues, and may not relate to their pollutant discharges (73 FR 12045, March 6, 2008).
2. **Number of Employees:** Facilities must have 10 or more full-time employees or their equivalent. EPA defines a "full-time equivalent" as a person who works 2,000 hours in the reporting year (there are several exceptions and special circumstances that are well defined in the TRI reporting instructions).
3. **Activity Thresholds:** If the facility is in a covered NAICS code and has 10 or more full-time employee equivalents, it must conduct an activity threshold analysis for every chemical and chemical category on the current TRI list. The facility must determine whether it manufactures, processes, or otherwise uses each chemical at or above the appropriate activity threshold. Reporting thresholds are not based on the amount of release. All TRI thresholds are based on mass, not concentration. Thresholds for persistent bioaccumulative toxic (PBT) chemicals are lower than for non-PBT chemicals.

In TRI, facilities report annual releases to the environment of each toxic chemical or chemical category that meets reporting requirements. TRI requires facilities to report on-site releases to air, receiving streams, disposal to land, underground wells, and several other categories. Facilities must also report the amount of toxic chemicals in wastes transferred to off-site locations, including discharges to POTWs and other off-site locations, such as commercial waste disposal facilities.

For this review, EPA focused on facility reports of chemical discharges directly to a receiving stream or transfers to a POTW. For discharges directly to a stream ("direct discharges"), EPA took the annual loads directly from the reported TRI data for calendar year 2007. For transfers of chemicals to POTWs ("indirect discharges"), EPA first adjusted the TRI pollutant loads to account for pollutant removal at the POTW prior to discharge to the receiving stream (see Section 2.4.2 for more details).

TRI does not require facilities to sample and analyze wastestreams to determine the quantities of toxic chemicals released. Facilities may estimate releases based on mass balance calculations, published emission factors, site-specific emission factors, or other approaches. Facilities must indicate the basis of their release estimate using a reporting code. According to TRI's reporting guidance, facilities should use one-half the detection limit to estimate mass releases of chemicals that are measured below their detection limit and are reasonably expected

to be present. Nondetects of dioxin and dioxin-like compounds, however, may be reported as zero.

TRI allows facilities to report releases as specific numbers or as ranges, if appropriate. Specific estimates are encouraged if data are available to ensure the accuracy; however, EPA allows facilities to report releases in the following ranges: 1 to 10 pounds, 11 to 499 pounds, and 500 to 999 pounds. For this review, if a facility reported releases in a range, EPA used the mid-point of each reported range to represent a facility's releases.

2.1.1 Utility of TRI

The data collected in TRI are particularly useful for the 304(m) review process for the following reasons:

- TRI includes data from all 50 states and U.S. territories;
- TRI includes transfers to POTWs, not just direct discharges;
- TRI includes discharge data from manufacturing NAICS codes and some other industrial categories which may handle significant quantities of toxic chemicals; and
- TRI includes releases of many chemicals, not just those already identified as problems and limited in facility discharge permits.

2.1.2 Constraints and Limitations of TRI

TRI provides comprehensive data for direct and indirect discharging facilities. However, EPA identified the following constraints and limitations to using TRI for the screening-level analysis:

- Small establishments (less than 10 employees) are not required to report, nor are facilities that do not meet the reporting thresholds. Therefore, facilities reporting to TRI may not provide a complete picture of the industry.
- Release reports are, in part, based on estimates, not measurements, which may result in inaccurately reported releases. For example, TRI encourages facilities to report some compounds as present at one-half the detection level if a facility suspects that the compound has the potential to be present, even if measured data show the compound is below its detection level. As a result, many companies are conservative and adopt this approach. For facilities with large flows, this can result in large estimates of pounds or TWPE of pollutant released with no measurements to support that the compound was ever present above the detection level.
- Certain chemicals (polycyclic aromatic compounds (PACs), dioxin and dioxin-like compounds, and metal compounds) are reported as a class, not as individual compounds. Because the individual compounds in the class have widely varying toxic effects, the potential toxicity of chemical releases can be inaccurately estimated.
- Facilities are identified by NAICS code, not point source category. For some NAICS codes, it may be difficult or impossible to identify the point source category that is the precise source of the toxic wastewater releases (see Section 1 for additional information).

- The list of chemicals covered by TRI is not all-inclusive and changes over time.
- Only facilities in certain NAICS codes are required to report; therefore, some sources of water pollutant discharges are not included.
- A facility is not required to report releases if the releases do not exceed the reporting threshold.
- Information in TRI does not represent national estimates because not all facilities are required to report to TRI.

Despite TRI's limitations and constraints, EPA has determined that it is appropriate to be used for an initial screening-level review and prioritization of the pollutant loadings discharged by industrial categories. EPA will further evaluate the prioritized categories in a second level of review which may include additional data collection and verification of data reported in TRI.

2.2 Overview of TRI Databases

EPA developed the end-user database, *TRIReleases2007*, in three steps:

1. Downloaded relevant data from TRI to create *TRIRawData2007* (see Section 2.3).
2. Estimated relative toxicity of discharges, set up groupings of facilities (by NAICS code and discharge type), and made corrections and adjustments to create *TRICalculations2007* (see Section 2.4).
3. Grouped the pollutant discharges in *TRICalculations2007* by NAICS code, point source category, and other groupings to create *TRIReleases2007* for rankings and other analyses (see Section 2.5).

Figure 2-1 shows how these three databases are related and the following sections describe the creation and particulates of each database in greater detail.

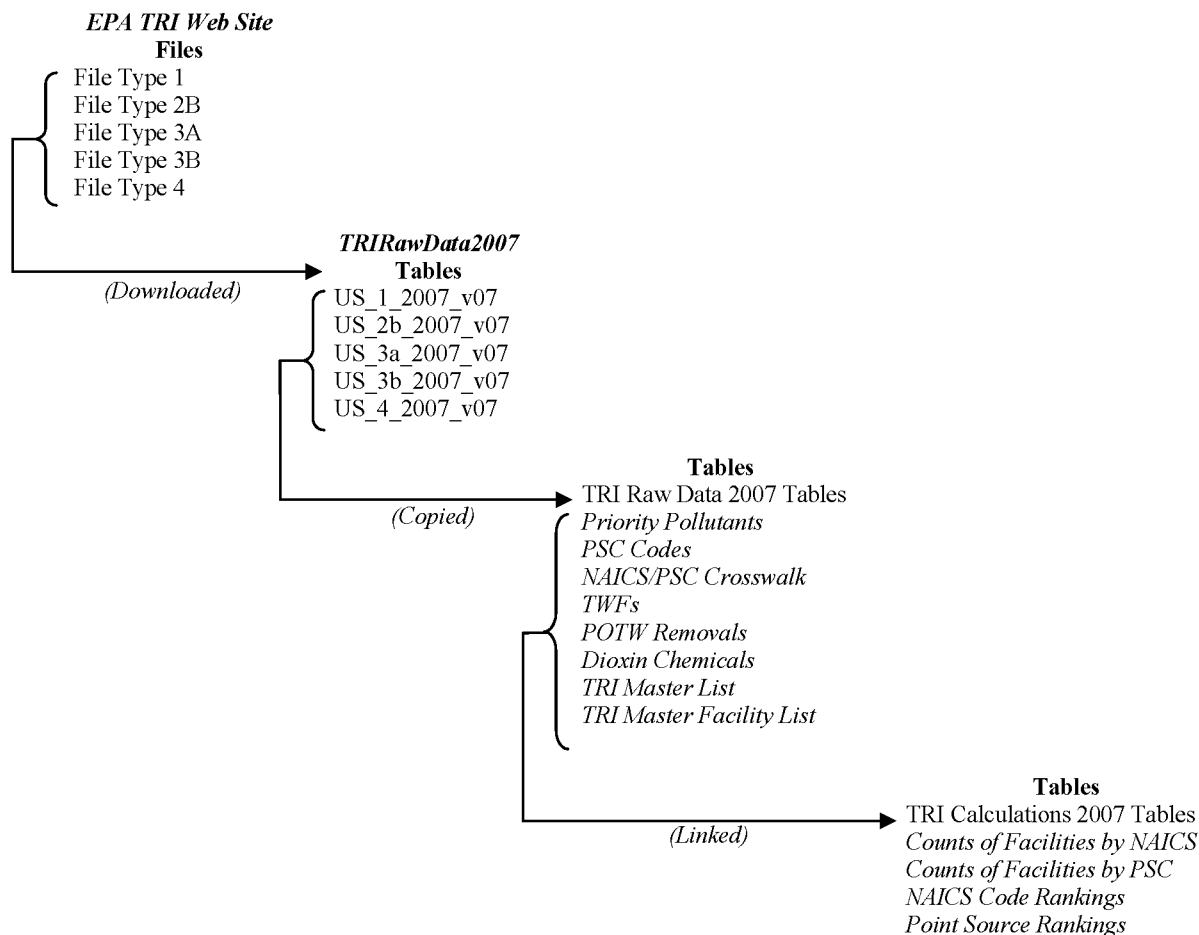


Figure 2-1. Relationship Between the Three TRI 2007 Databases

2.3 TRIRawData2007

EPA created *TRIRawData2007* using the 2007 TRI data for all of the United States, which are available from the EPA Web site (www.epa.gov/tri). Table 2-1 lists the relevant TRI 2007 files that EPA imported into the Microsoft Access™ database.

Table 2-1. TRI 2007 Tables Downloaded from EPA

Table Name	Description of File Contents
“File Type 1: Facility, Chemical, Releases and Other Waste Management Summary Information”	Facility information (Part I on Form R and Form A), as well as most chemical information (Part II on Form R and Form A). Data elements are reported individually. The information is also disaggregated based on Waste Management code (i.e., Management "M" code reported on TRI Form R), and aggregated up to On-site Releases, Off-site Releases, Other On-site Waste Management, and Transfers Off Site for Further Waste Management categories.
“File Type 2B: Detailed On-Site Waste Treatment Methods and Efficiency”	Facility information (Part I on Form R and Form A) and On-site Waste Treatment Methods and Efficiency data (Part II, Section 7A on Form R).

Table 2-1. TRI 2007 Tables Downloaded from EPA

Table Name	Description of File Contents
“File Type 3A: Details of Transfers Off Site”	Facility information (Part I on Form R and Form A) as well as details of individual transfers off-site (Part II, Section 6.2 on Form R).
“File Type 3B: Details of Transfers to POTW”	Facility information (Part I on Form R and Form A) as well as a list of POTWs (Part II, Section 6.1.B on Form R).
“File Type 4: Details of Facility Information”	Facility information (Part I on Form R and Form A) for all facilities that have ever reported to the TRI program. The "reporting year" field at the beginning of each record identifies the last year the facility reported to the TRI program.

Source: <http://www.epa.gov/tri/tridata/tri07/data/index.htm>.

2.4 *TRICalculations2007*

As the second step in developing *TRIRelases2007*, EPA created *TRICalculations2007* by copying raw data tables from *TRIRawData2007*, omitting unrelated data (e.g., air emissions and source reduction activities), and performing the following actions:

- Corrected NAICS code classification for certain facilities and chemicals and corrected certain reported chemical quantities (Section 2.4.1);
- Estimated POTW removals for indirect discharges (Section 2.4.2);
- Estimated the mass-based and toxic-equivalent pollutant loadings (Section 2.4.3);
- Combined releases of parent metals and their associated compounds (Section 2.4.4); and
- Determined basis of TRI release and transfer estimates (Section 2.4.5).

To perform the calculations listed above, EPA imported tables from previous versions of EPA’s *TRICalculations* databases containing Chemical Abstract Service (CAS) numbers, TWFs, and POTW removal rates. Table 2-2 lists the database tables that EPA imported or created in *TRICalculations2007*.

Table 2-2. Tables Imported or Created in *TRICalculations2007*

Table Name	Created or Imported?	Description
“All Water Releases”	Created using VBA code	Lists calculated TWPE for every chemical discharge reported to TRI in 2007 for which EPA has calculated a TWF. EPA developed this table using data from <i>TRIRawData2007</i> and TWF tables. This table serves as an intermediate table between the <i>TRIRawData2007</i> tables and the <i>TRI Master List</i> Table.
“Dioxin Chemicals”	Imported from <i>TRIRelases2005</i>	Lists the 17 dioxin congeners and the TRI congener number associated with each.
“Dioxin Distributions”	Created using VBA Code	Lists the dioxin distributions (see Section 2.4.3) of all facilities reporting dioxin discharges in 2007. EPA developed this table using data from <i>TRIRawData2007</i> .
“Manual Data Changes”	Created	Documents any changes that EPA made to the data from <i>TRIRawData2007</i> .
“Manual Dioxin Distribution Changes”	Created ^a	Documents changes that EPA made to the dioxin distributions from <i>TRIRawData2007</i> .

Table 2-2. Tables Imported or Created in *TRICalculations2007*

Table Name	Created or Imported?	Description
“Manual Load Changes”	Created ^a	Documents changes that EPA made to the magnitude of the discharges in the data from <i>TRIRawData2007</i> .
“Manual NAICS Code Changes”	Created ^a	Documents changes that EPA made to the NAICS codes in the data from <i>TRIRawData2007</i> .
“NAICS Code Changes”	Created ^a	Documents changes that EPA makes every year to the NAICS codes of the discharges in the data from <i>TRIRawData2007</i> .
“NAICS Code Changes (for facilities with no NAICS Codes)”	Created ^a	Documents the NAICS codes that EPA assigned to facilities with no NAICS codes in the data from <i>TRIRawData2007</i> .
“NAICS_Codes”	Created	Lists U.S. Economic Census definitions of the NAICS codes. EPA developed this table using information from the U.S. Economic Census Web site (www.census.gov).
“OCPSF Pesticides”	Created using VBA code	Lists all pesticide discharges reported for 2007 classified under the Pesticide Chemicals Category.
“Parent Metals and Compounds”	Imported from <i>TRIRelases2005</i>	Links parent metals to the appropriate metal compound groups (e.g., nickel and nickel compounds).
“Pesticides Chemical List”	Imported from <i>TRIRelases2005</i>	Lists all chemicals classified as pesticides under the Clean Water Act.
“POTW Removals”	Imported from <i>TRIRelases2005</i>	Lists all 612 TRI chemicals and chemical compounds and their chemical-specific average POTW percent removal. See “POTW Percent Removals Used for the <i>TRIRelases2002</i> Database” (Coddling, 2005) (see Section 2.4.2),
“Priority Pollutants”	Imported from <i>TRIRelases2000</i>	Lists priority pollutants (CAS number and chemical name).
“PSC Codes”	Imported from <i>TRIRelases2005</i>	Defines all codes for point source categories.
“PSC/NAICS Crosswalk”	Created	EPA used the “SIC/Point Source Category Crosswalk” table from <i>TRIRelases2000</i> and the NAICS/SIC Crosswalk developed for the 2002 U.S. Economic Census to develop this table (see Section 1).
“PSC/NAICS Crosswalk_without_M PM_fixed”	Created	Identifies NAICS codes that could have discharges subject to the Metal Products and Machinery (MP&M) ELGs. EPA created this table from information in the MP&M rulemaking.
“Pulp and Paper Dioxin Distribution”	Imported from <i>TRIRelases2005</i>	Contains the dioxin distribution used for facilities in the Pulp, Paper, and Paperboard Category that do not report a facility-specific distribution. EPA developed this table using information obtained from the pulp and paper industry (Matuzko et al., 2006).
“Pulp and Paper Phases”	Imported from <i>TRIRelases2005</i>	Lists the NAICS code placeholders used to identify facilities in the Pulp, Paper, and Paperboard Category by regulatory phase.
“TRI Raw Data 2007 Tables”	Imported from <i>TRIRawData2007</i>	Copy of all original TRI tables stored in the <i>TRIRawData2007</i> database and deleted information not needed for the 2009 annual review.
“Point Source Category Codes”	Imported from <i>TRIRelases2005</i>	Lists point source categories and corresponding point source category codes.

Table 2-2. Tables Imported or Created in *TRICalculations2007*

Table Name	Created or Imported?	Description
“TWFs”	Imported from <i>TRIReleases2005</i>	Lists TWF for chemicals based on the Office of Water references. EPA originally created this table using TWFs as of December 2004 and updates it with TWFs created or revised after 2004 (see Section 5).
“TRI Chemicals with MP&M y/n”	Imported from <i>TRIReleases2005</i>	Lists chemicals regulated by the MP&M rulemaking.
“TRI Master List”	Created using VBA code	Lists calculated pounds and TWPE for every chemical released by every facility reporting to TRI in 2007. EPA developed this table using data from “All Water Releases” and “TWFs” tables.
“TRI Master Facility List”	Created using VBA code	Complete and unique list of all facilities reporting to TRI, relevant facility information (address, contacts, etc.), and corresponding primary NAICS codes. EPA developed this table using data from <i>TRIRawData2007</i> .
“Wood Preserving Dioxin Distribution”	Imported from <i>TRIReleases2005</i>	Contains the dioxin distribution used for facilities in the Wood Preserving Category that do not report a facility-specific distribution. EPA developed this table using information obtained from the wood preserving industry.

^a Most of these changes are based on previous knowledge about the facility’s operations from previous annual reviews. EPA also added changes discovered as part of the 2009 annual review. See Section 2.4.1 for additional information.

VBA – Visual Basic for Applications.

2.4.1 Modifications to TRI-Reported Data

Modifications to TRI-Reported data include the following facility-specific changes:

- Pollutant loading changes;
- Dioxin distribution changes; and
- NAICS code changes.

During the screening-level reviews of the 2000 through 2007 TRI data, EPA made corrections to *TRIReleases* databases based on information received from stakeholders, including industry trade associations, facilities, and pretreatment coordinators. The SIC code corrections identified for past years of review were converted to NAICS code corrections using the U.S. Economic Census linkages and similarly applied to the 2007 data, as appropriate. In addition, EPA conducted a quality review of the *TRIReleases2007* database (described in Section 6). As a result of this review, EPA made 58 corrections¹ to the 2007 releases. Table A-3 in Appendix A, lists the corrections EPA made to the *TRIReleases2007* database.

EPA assigned pollutant loadings to point source categories based on the primary NAICS code that facilities reported (see Section 1). A facility reports up to six NAICS codes to TRI and specifies one primary NAICS code. In cases where EPA was able to identify that chemical

¹ In addition to the 58 changes that were made to individual releases reported to TRI, EPA made 795 NAICS code changes to account for facilities that did not report a NAICS code and SIC code changes that EPA had made to facilities in past years. EPA identified the appropriate NAICS code for facilities that did not report a NAICS code using Envirofacts.

releases to surface water or a POTW were related to activities covered by a different NAICS code, EPA corrected the NAICS code assigned to the facility and/or chemical. For example, a facility may report their primary NAICS code as 325110, Petrochemical Manufacturing. The facility may also perform pesticide manufacturing, which is covered under NAICS code 325320, Pesticide and Other Agricultural Chemical Manufacturing. If this facility reported a pesticide release, EPA assigned the pesticide release to the Pesticide Chemicals Category, because these pollutant discharges are regulated under the Pesticide Chemicals Category, not the Organic Chemicals, Plastics, and Synthetic Fibers Category. Section 1 in this report provides a detailed discussion of the development of the crosswalk between the NAICS code and point source category.

2.4.2 POTW Removals

For facilities that reported transfers of chemicals to POTWs, EPA first adjusted the reported pollutant loads to account for pollutant removal that occurs at the POTW prior to discharge to the receiving stream. EPA estimated the pounds of facilities' waste released to the surface water after POTW removal using the following equation²:

$$\text{Release to Stream (lbs/yr)} = [\text{Transfer to POTW (lbs/yr)}] \times [1 - \text{POTW Removal (\%)}]$$

EPA developed a POTW removal hierarchy for the *TRIReleases2002* database, described in the memorandum entitled "POTW Percent Removals Used for the *TRIReleases* Databases" (Coddling, 2005). The *TRIReleases2007* database uses the same POTW removal hierarchy. In short, EPA used removal efficiencies from the following data sources, listed in order of preference:

1. Recent effluent guidelines rulemakings;
2. EPA/Office of Research and Development's National Risk Management and Research Laboratories treatability database; and
3. EPA/Office of Prevention, Pesticides, and Toxic Substances' Risk Screening Environmental Indicators model.

Table A-4 in Appendix A lists the POTW Removals and their data sources, in alphabetical order.

2.4.3 TWFs

To identify potential impacts on human health and the environment, EPA estimated toxic equivalent mass discharge through the use of TWFs. EPA used the "TWFs" table, which lists TWFs by CAS number, in *TRICalculations2007* to calculate TWPE for chemical discharges. If the table did not list a TWF for a specific parameter, EPA did not include pollutant discharges for this chemical in its TWPE estimates. Section 5 describes TWFs in more detail. See also *Toxic Weighting Factor Development in Support of the 304(m) Planning Process* (ERG, 2005).

In some cases, EPA calculated industry-specific TWFs for certain chemical compound categories reported in TRI. These TWFs were not used to calculate TWPE for chemical

² For example, the POTW removal efficiency for lithium carbonate is 1.85 percent. That is if 10,000 lbs of lithium carbonate discharged to a POTW, only 9,815 lbs of lithium carbonate will be discharged from the POTW to surface waters as this amount is untreated by the POTW [9,815 lbs = 10,000 lbs × (1 - 0.0185)].

discharges in PCS/ICIS-NPDES. EPA created specific TRI TWFs when it had additional information about the composition of the compound category, as released from specific industries. Table 2-3 lists the calculated TWFs.

Table 2-3. TWF Modifications

Chemical	Point Source Category	TWF
Dioxins	All	Apply individual dioxin compound TWF using the following dioxin congener distribution: 1) facility-specific, 2) industry specific, 3) NAICS-code-average, or 4) median dioxin TWF for all dioxin congeners.
Creosote	All	1.3577 ^a
PACs	All point source categories, except those in the Petroleum Refining; Wood Preserving; and Pulp, Paper, and Paperboard Categories	100.66
PACs	Petroleum Refining Category	26.28 ^b
PACs	Wood Preserving Category	8.36 ^b
PACs	Pulp, Paper, and Paperboard Category	34.21 ^c

^a Calculations of TWF and TWPE for Creosote from Wood Preserving Facilities (Bicknell, 2004).

^b TRI 2002 PACs TWF for Petroleum Refining, Creosote, and Wood Preserves (Finseth, 2005).

^c NCASI SARA Handbook – Table 5 PAC Concentrations in Pulp Mill Effluents (H.C. Lavalley, Inc., 2005).

The remainder of this subsection describes how EPA developed the TWFs, in the following order:

- Dioxins for all categories;
- Creosote for all categories;
- Wood Preserving Category creosote;
- Polycyclic Aromatic Compounds (PACs) for all categories;
- Petroleum Refining Category PACs;
- Wood Preserving Category PACs; and
- Pulp, Paper, and Paperboard Category PACs.

Dioxins

The term ‘dioxins’ refers to polychlorinated dibenzo-p-dioxins (CDDs) and polychlorinated dibenzofurans (CDFs), which constitute a group of PBT chemicals. There are 17 CDDs and CDFs congeners with chlorine substitution of hydrogen atoms at the 2, 3, 7, and 8 positions on the benzene rings, the most toxic of which is 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). The 17 compounds (called congeners) are referred to as ‘dioxin-like,’ because they have similar chemical structure, similar physical-chemical properties, and invoke a common battery of toxic responses (U.S. EPA, 2000), though the toxicity of the congeners varies greatly. In this report, EPA uses the term “dioxin and dioxin-like compounds” to refer to all 17 of the 2,3,7,8-substituted CDDs and CDFs.

EPA developed TWFs for each of the 17 dioxin congeners, ranging from 703,584,000 for 2,3,7,8-TCDD to 2,021 for octachlorodibenzofuran. Due to their toxicity and ability to bioaccumulate, the various dioxin congeners have high TWFs relative to most chemicals.

Consequently, even small mass amounts of dioxin and dioxin-like compound discharges translate into high TWPEs. Table 2-4 presents the dioxin congener-specific TWFs used in the screening-level analysis.

Table 2-4. Dioxins Congeners and Their Toxic Weighting Factors

CAS Number	Chemical Name	Abbreviated Name	Toxic Weighting Factor
CDDs			
1746-01-6	2,3,7,8-tetrachlorodibenzo-p-dioxin	2,3,7,8-TCDD	703,584,000
40321-76-4	1,2,3,7,8-pentachlorodibenzo-p-dioxin	1,2,3,7,8-PeCDD	692,928,000
39227-28-6	1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	1,2,3,4,7,8-HxCDD	23,498,240
57653-85-7	1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	1,2,3,6,7,8-HxCDD	9,556,480
19408-74-3	1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	1,2,3,7,8,9-HxCDD	10,595,840
35822-46-9	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	1,2,3,4,6,7,8-HpCDD	411,136
3268-87-9	1,2,3,4,6,7,8,9-octachlorodibenzo-p-dioxin	1,2,3,4,6,7,8,9-OCDD	6,586
CDFs			
51207-31-9	2,3,7,8-tetrachlorodibenzofuran	2,3,7,8-TCDF	43,819,554
57117-41-6	1,2,3,7,8-pentachlorodibenzofuran	1,2,3,7,8-PeCDF	7,632,640
57117-31-4	2,3,4,7,8-pentachlorodibenzofuran	2,3,4,7,8-PeCDF	557,312,000
70648-26-9	1,2,3,4,7,8-hexachlorodibenzofuran	1,2,3,4,7,8-HxCDF	5,760,000
57117-44-9	1,2,3,6,7,8-hexachlorodibenzofuran	1,2,3,6,7,8-HxCDF	14,109,440
72918-21-9	1,2,3,7,8,9-hexachlorodibenzofuran	1,2,3,7,8,9-HxCDF	47,308,800
60851-34-5	2,3,4,6,7,8-hexachlorodibenzofuran	2,3,4,6,7,8-HxCDF	51,204,160
67562-39-4	1,2,3,4,6,7,8-heptachlorodibenzofuran	1,2,3,4,6,7,8-HpCDF	85,760
55673-89-7	1,2,3,4,7,8,9-heptachlorodibenzofuran	1,2,3,4,7,8,9-HpCDF	3,033,984
39001-02-0	1,2,3,4,6,7,8,9-octachlorodibenzofuran	1,2,3,4,6,7,8,9-OCDF	2,021

Source: *Toxic Weighting Factor Development in Support of the 304(m) Planning Process* (ERG, 2005).

Beginning with reporting year 2000, facilities meeting certain reporting criteria were required to report to TRI the total mass, in grams, of the 17 dioxin and dioxin-like compounds released to the environment every year. This reporting method does not account for the relative toxicities of the 17 compounds. However, reporting facilities are given the opportunity to report a facility-specific congener distribution. Yet even if dioxins are released to more than one medium, the facility can report only one distribution. EPA cannot know if the single dioxin congener distribution reported by a facility accurately reflects the dioxin distribution in wastewater³. Nevertheless, it is the best available information and EPA uses it to calculate the reporting facility's dioxin TWPE.

To account for the relative toxicities of the different dioxin congeners, EPA first converted the reported dioxin releases from grams to pounds to be consistent with the units used for other chemicals. EPA then calculated dioxin TWPE estimates using the facility-specific congener distributions for all facilities that reported a distribution. Based on information

³ Beginning with reporting year 2008, facilities will be required to submit information on the amount of each individual dioxin congener where that information is available. Facilities that cannot quantify dioxin releases by congener may continue to report an aggregate number (72 FR 26544; May 10, 2007).

provided by the facilities that were contacted as part of previous and current quality reviews, EPA made corrections to the reported dioxin distributions for the facilities presented in Table 2-5. Table 2-5 also includes the reason for the correction.

Table 2-5. EPA Facility-Specific Dioxin Congeners Distribution Corrections

Facility Name	Facility Location	Reason for Dioxin Congener Distribution Change
Cahaba Pressure Treated Forest Products Inc.	Brierfield, AL	The facility did not use the industry-provided dioxin distribution (Woodruff, 2007).
Du Pont Memphis Plant	Memphis, TN	The facility provided more detailed information about the dioxin measurements (Zweig, 2000).
Louisiana Pigment Co LP	Westlake, LA	The facility provided more detailed information about the dioxin measurements (Kashyap, 2009).
Colfax Treating Co LLC	Pineville, LA	The facility did not use the industry-provided dioxin distribution based on pentachlorophenol distribution (Johnston, 2004).
Eastman Kodak Co Kodak Park	Rochester, NY	The facility provided more detailed information about the dioxin measurements (Moeller, 2009)

EPA calculated an average dioxin distribution for each NAICS code which had reported dioxin releases. For facilities that did not report a dioxin distribution, EPA used the average NAICS code distribution to calculate the facility's dioxin TWPE. EPA calculated industry-specific dioxin distributions for the Petroleum Refining and the Pulp, Paper, and Paperboard Categories based on information received from industry trade groups. For facilities that did not report a congener distribution and did not have any facilities within its NAICS code that reported a congener distribution, EPA used a TWF equal to 10,595,840 (the median of the 17 dioxin congener TWFs).

Creosote

Creosote is a commonly used wood preservative, comprising many different chemicals. EPA did not develop a TWF for creosote using creosote toxicity data. Instead, EPA used the chemical composition of creosote, provided in IARC Monographs, Vol 35, "Coal Tar and Derived Products," (WHO, 1998) and the TWFs for these individual chemicals to calculate a TWF for creosote.

EPA made the following assumptions in developing the TWF for creosote:

1. Chemicals will be present in wastewater in the same proportion that they are present in the creosote.
2. If no TWF was available for a specific chemical, its concentration in creosote was assumed to be zero.

Using the data provided in IARC Monographs, Vol 35, EPA calculated the average percentage that the chemical represents in creosote based on the high and low value (WHO, 1998). EPA calculated an adjusted TWF for each chemical by multiplying its chemical-specific TWF by its average percentage in creosote. EPA summed these values to calculate a new overall TWF for creosote discharges. Table 2-6 lists the chemical composition of creosote, along with the associated TWF of the various chemicals.

Table 2-6. Chemical Composition of Creosote and TWF

Pollutant	Chemical Percentage (%)	TWF	Adjusted TWF
Acenaphthene	11.85	0.0325697	0.0038595
Antracene	4.50	2.5455945	0.1145518
Benz(a)anthracene	0.21	30.695	0.0644595
Benzo(a)pyrene	0.05	100.66	0.05033
Benzofluorenes	1.50	0.1555556	0.0023333
Biphenyl	1.20	0.0365558	0.0004387
Carbazole	1.60	0.709071	0.0113451
Chrysene	2.80	31.01	0.86828
Dibenz(a,h)anthracene	0.03	30.772	0.0092316
Dibenzofuran	5.75	0.49215	0.0282986
Dimethylnaphthalenes	2.15		0
Fluoranthene	5.25	1.2846944	0.0674465
Fluorene	8.65	0.70105	0.0606408
Methylantracenes	3.95		0
Methylfluorenes	2.65	0.0486957	0.0012904
1-Methylnaphthalene	6.45	0.0062222	0.0004013
2-Methylnaphthalene	6.60	0.1930493	0.0127413
Methylphenanthrenes	3.00	0.1037037	0.0031111
Naphthalene	9.65	0.0158701	0.0015315
Phenanthrene	18.50	0.2947368	0.0545263
Pyrene	4.75	0.0932033	0.0044272
Total			1.36

Creosote Releases from Wood Preserving Facilities

EPA received information from the Southern Pressure Treaters Association in 2005 that indicates creosote discharges are estimated based on a surrogate analyte, such as oil and grease or total phenols. The Southern Pressure Treaters Association also indicated that TRI-reported PAC discharges are usually estimated based on the creosote estimates, but there is no standard approach for making these estimates (H.M. Rolling Company, 2005). PACs and creosote contain many of the same chemicals (compare Table 2-7 and Table 2-6, respectively). Consequently, if EPA estimated the TWPE for both the PACs and the creosote in the same discharge, then the discharges of some toxic chemicals would be double counted. For this reason, if a wood preserving facility reports PACs and creosote in the same discharge (e.g., both are reported in direct discharges to surface water), EPA included the TWPE for the PAC discharges, but not the creosote discharges. If the wood preserving facility reports only creosote releases (and not PACs), EPA used the calculated creosote TWF of 1.36 to calculate the TWPE.

Polycyclic Aromatic Compounds (PACs)

PACs, sometimes known as polycyclic aromatic hydrocarbons (PAHs), are a class of organic compounds consisting of two or more fused aromatic rings. Table 2-7 lists the 21 individual compounds in the PAC category for TRI reporting, CAS number, and TWF, if available. EPA has TWFs for only eight of the 21 PACs chemicals.

Table 2-7. Definition of Polycyclic Aromatic Compounds

PAC Compound	CAS Number	Toxic Weighting Factor
Benzo(a)anthracene	56-55-3	36.2600
Benzo(a)phenanthrene (chrysene)	218-01-9	31.0100
Benzo(a)pyrene	50-32-8	100.6600
Benzo(b)fluoranthene	205-99-2	30.6600
Benzo(j)fluoranthene	205-82-3	NA
Benzo(k)fluoranthene	207-08-9	30.6600
Benzo(j,k)fluorene (fluoranthene)	206-44-0	0.8290
Benzo(r,s,t)pentaphene	189-55-9	NA
Dibenz(a,h)acridine	226-36-8	NA
Dibenz(a,j)acridine	224-42-0	NA
Dibenzo(a,h)anthracene	53-70-3	30.6600
Dibenzo(a,e)fluoranthene	5385-75-1	NA
Dibenzo(a,e)pyrene	192-65-4	NA
Dibenzo(a,h)pyrene	189-64-0	NA
Dibenzo(a,l)pyrene	191-30-0	NA
7H-Dibenzo(e,g)carbazole	194-59-2	NA
7,12-Dimethylbenz(a)anthracene	57-97-6	NA
Indeno(1,2,3-cd)pyrene	193-39-5	30.6600
3-Methylcholanthrene	56-49-5	NA
5-Methylchrysene	3697-24-3	NA
1-Nitropyrene	5522-43-0	NA

NA – Not available. EPA has not developed TWFs for these compounds.

PACs are classified as PBTs. They are likely present in petroleum products such as crude oil, fuel oil, diesel fuel, gasoline, and paving asphalt (bituminous concrete) and refining by-products such as heavy oils, crude tars, and other residues. PACs form as the result of incomplete combustion of organic compounds. PACs and closely related compounds are major constituents of creosote, a commonly used wood preservative.

For TRI, facilities that manufacture, process, or use more than 100 pounds of PACs per year must report the combined mass of PACs released; they do not report releases of individual compounds. In the development of *TRIReleases2007* EPA assigned the TWF of benzo(a)pyrene to PACs, with the exception of releases reported by facilities in the Petroleum Refining; Wood Preserving; and Pulp, Paper, and Paperboard Categories (for which EPA has more detailed information). Because the TWF for benzo(a)pyrene (100.66) is higher than any other PAC, this

represents a worst-case scenario. For PAC discharges that are not completely benzo(a)pyrene, this method overestimates the relative toxicity of the discharges.

Petroleum Refining PACs

EPA used available data for the Petroleum Refining Category to calculate TWPE for PACs reported by petroleum refining facilities. Facilities report to TRI the combined mass of PACs released, but for this industry EPA used information on the distribution of PACs in refinery products from the American Petroleum Institute (API, 1994). EPA assumed that the composition of PACs released by refineries is proportional to the composition of raw materials (crude oil) and products throughput at U.S. refineries. EPA developed this methodology for the Petroleum Refining Detailed Study supporting the 2004 Effluent Guidelines Program Plan (U.S. EPA, 2004). After the methodology was developed, the calculated refinery PAC TWF changed due to the changes in TWFs for individual PAC chemicals.

PACs can occur in a number of petroleum products and crude oils; this information is available in literature (see Table 2-8 and Table 2-9). In addition, the Energy Information Administration (EIA) publishes a yearly report of the amount of petroleum products produced in all U.S. petroleum refineries as well as the amount of crude oil consumed (see Table 2-10).

EPA made the following assumptions in developing the TWF for Petroleum Refining Category PACs:

1. PACs will be present in wastewater in the same proportion that they are present in the crude oil and products throughput at U.S. refineries. Table 2-10 presents these proportions.
2. If EPA did not have literature data available for a specific PAC compound, its concentration in the crude oil or product was assumed to be zero. If a PAC compound was reported as not detected, its concentration in the crude oil or product was assumed to be zero.
3. Where PAC composition is not available, it can be estimated using the composition from similar products. Table 2-11 lists the products for which PAC composition is not available and the similar product used to estimate the composition.
4. For crude oil, representative domestic and foreign oils can be used to calculate a weighted average PAC composition for crude oil. According to EIA⁴, 39.1 percent (volumetric basis) of the total consumed crude oil in the United States in the year 2000 was domestic while 60.9 percent (volumetric basis) was imported. EPA selected South Louisiana Oil, for which PAC composition is available, as a representative domestic oil and Alberta Oil as a representative foreign oil. EPA assumed that a weighted average of the composition of these two crude oils is a reasonable representation of crude oil composition for the purpose of this study. EPA also used a specific weight of 0.92 for crude oil to convert PAC concentrations reported as mg/kg to mg/L.
5. For refined products, EPA assumed a specific weight of 1.0 to simplify the calculation (i.e., no need to convert between mg/kg and mg/L).

⁴ EIA: Petroleum Supply Annual 2000, Vol 1, Page 6 (EIA, 2001).

Based on the above assumptions, EPA calculated the overall TWF using Equation 2-1 where the concentration of each of the 21 TRI PACs in each crude or finished petroleum product is multiplied by its respective TWF. The concentration of each PAC in petroleum crude oil or products is represented by the variable $[m_i]_j$ and listed in Table 2-8 for products or Table 2-9 for crude oils. The products in each product produced by U.S. refineries are represented by the variable Q and listed in Table 2-10 while the respective TWFs are listed in Table 2-12. This calculation resulted in an equivalent TWF for each type of product supplied to U.S. refineries. EPA then multiplied the mass of each type of product by the respective equivalent TWF and summed this quantity for all products received by U.S. refineries. Dividing this sum by the total sum of all products received by U.S. refineries resulted in an equivalent TWF for the PACs present in wastewaters from U.S. refineries.

$$\text{Overall TWF} = \sum_i \frac{Q_i \sum_j [m_j]_i \cdot (\text{TWF})_j}{Q_i} \quad (\text{Eqn. 2-1})$$

where:

Q_i = Quantity of Product 'i' Supplied to U.S. Refineries
 $[m_j]_i$ = Estimated concentration of PAC compound 'j' in Product 'i'

This calculation resulted in a TWF value of 25.417. The TWPE of the combined mass of PACs reported to TRI by petroleum refineries can then be calculated by multiplying the reported PAC releases by 25.417.

Table 2-8. PAC Concentrations in Petroleum Products

PAC Chemical Name	Gasoline mg/L	Kerosene ppm (wt/vol)	No. 2 Diesel Fuels	Bunker C No. 6 Oil	Paving Asphalt	Lube Oil ⁶ mg/kg
			mg/L or mg/kg			
Benzo(a)anthracene	4.30	0.75	0.80	90.00	90.00	0.68
Benzo(a)phenanthrene (chrysene)	2.00	2.00	3.40	196.00	80.00	3.20
Benzo(a)pyrene	1.80	0.50	NP	44.00	1.30	0.23
Benzo(b)fluoranthene	NP	0.75	NP	NP	NP	0.627
Benzo(j)fluoranthene	NP	NP	NP	NP	NP	NP
Benzo(k)fluoranthene	NP	0.50	NP	NP	1.80	NP
Benzo(j,k)fluorene (fluoranthene)	6.50	4.00	2.80	240.00	NP	2.00
Benzo(r,s,t)pentaphene	NP	NP	NP	NP	NP	NP
Dibenz(a,h)acridine	NP	0.20	NP	NP	NP	NP
Dibenz(a,j)acridine	NP	NP	NP	NP	NP	NP
Dibenzo(a,h)anthracene	NP	0.75	NP	NP	4.60	NP
Dibenzo(a,e)fluoranthene	NP	NP	NP	NP	NP	NP
Dibenzo(a,e)pyrene	NP	0.45	NP	NP	NP	NP
Dibenzo(a,h)pyrene	NP	1.00	NP	NP	NP	NP
Dibenzo(a,l)pyrene	NP	NP	NP	NP	NP	NP
7H-Dibenzo(e,g)carbazole	NP	NP	NP	NP	NP	NP

Table 2-8. PAC Concentrations in Petroleum Products

PAC Chemical Name	Gasoline mg/L	Kerosene ppm (wt/vol)	No. 2 Diesel Fuels	Bunker C No. 6 Oil	Paving Asphalt	Lube Oil ⁶ mg/kg
			mg/L or mg/kg			
7,12-Dimethylbenz(a)anthracene	NP	NP	NP	NP	NP	NP
Indeno(a,2,3-cd)pyrene	NP	2.00	NP	NP	NP	NP
3-Methylcholanthrene	NP	0.10	NP	NP	NP	NP
5-Methylchrysene	NP	NP	6.00	NP	NP	NP
1-Nitropyrene	NP	NP	NP	NP	NP	NP

Source: Data compiled in the American Petroleum Institute's *Transport and Fate of non-BTEX Petroleum Chemicals in Soil and Groundwater* (API, 1994).

NP – Not present.

Table 2-9. PAC Concentrations in Crude Oils (mg/kg)

PAC Chemical Name	South Louisiana Crude Oil	Alberta Crude Oil	Weighted Average
Benzo(a)anthracene	1.7000	NP	0.6645
Benzo(a)phenanthrene (chrysene)	17.5600	30.0000	25.1372
Benzo(a)pyrene	0.7500	NP	0.2932
Benzo(b)fluoranthene	0.5000	4.0000	2.6319
Benzo(j)fluoranthene	0.9000	NP	0.3518
Benzo(k)fluoranthene	1.3000	NP	0.5082
Benzo(j,k)fluorene (fluoranthene)	5.0000	6.0000	5.6091
Benzo(r,s,t)pentaphene	NP	NP	NP
Dibenz(a,h)acridine	NP	NP	NP
Dibenz(a,j)acridine	NP	NP	NP
Dibenzo(a,h)anthracene	NP	NP	NP
Dibenzo(a,e)fluoranthene	NP	NP	NP
Dibenzo(a,e)pyrene	NP	NP	NP
Dibenzo(a,h)pyrene	NP	NP	NP
Dibenzo(a,l)pyrene	NP	NP	NP
7H-Dibenzo(c,g)carbazole	NP	NP	NP
7,12-Dimethylbenz(a)anthracene	NP	NP	NP
Indeno(a,2,3-cd)pyrene	NP	NP	NP
3-Methylcholanthrene	NP	3.0000	1.8273
5-Methylchrysene	NP	NP	NP
1-Nitropyrene	NP	NP	NP

Source: Data compiled in the American Petroleum Institute's *Transport and Fate of non-BTEX Petroleum Chemicals in Soil and Groundwater* (API, 1994).

NP – Not present.

Table 2-10. Supply and Disposition of Crude Oil and Petroleum Products

Crude and Finished Petroleum Products	1,000 bbl/year	% (Products Only)	Volume % (Total)
Finished Motor Gasoline	2,910,056	48.08	25.16
<i>Reformulated</i>	939,493	NP	NP
<i>Oxygenated</i>	42,221	NP	NP
<i>Other</i>	1,928,342	NP	NP
Finished Aviation Gasoline	6,543	0.11	0.06
Jet Fuel	587,974	9.71	5.08
<i>Naphtha-Type</i>	75	NP	NP
<i>Kerosene-Type</i>	587,899	NP	NP
Kerosene	23,860	0.39	0.21
Distillate Fuel Oil	1,310,158	21.65	11.33
<i>0.05% Sulfur and under</i>	905,064	NP	NP
<i>Greater than 0.05% sulfur</i>	405,094	NP	NP
Residual Fuel Oil	254,843	4.21	2.20
Naphtha For Petroleum Feed Use	74,039	1.22	0.64
Other Oils For Petroleum Feed Use	71,762	1.19	0.62
Special Naphthas	21,868	0.36	0.19
Lubricants	65,687	1.09	0.57
Waxes	6,478	0.11	0.06
Petroleum Coke	266,107	4.40	2.30
Asphalt and Road Oil	192,223	3.18	1.66
Still Gas	241,365	3.99	2.09
Miscellaneous Products	19,957	0.33	0.17
Total Products	6,052,920	100	52.33
Crude Oil	5,514,395	—	47.67
TOTAL VOLUME OF PRODUCTS & CRUDE OIL	11,567,315	—	100

Source: *Petroleum Supply Annual 2000, Vol. 1, Page 6* (EIA, 2001).

NP – Not present.

Table 2-11. Products for Which PAC Composition Is Not Available

Product	PAC Composition Taken from:
Finished Aviation Gasoline	Gasoline
Jet Fuel	Gasoline
Miscellaneous Products	Gasoline
Naphtha For Petroleum Feed Use	Gasoline
Other Oils For Petroleum Feed Use	Gasoline
Petroleum Coke	Paving Asphalt
Special Naphtha	Gasoline
Still Gas	Gasoline
Waxes	Lube Oil

Table 2-12. Calculation of Toxic Weighting Factor for Petroleum PACs

Pollutant	TWF	Chemical Percentage (%)	Adjusted TWF
Benzo(a)anthracene	36.26	17.47	5.36
Benzo(a)phenanthrene (Chrysene)	31.01	46.29	14.35
Benzo(a)pyrene	100.66	4.17	4.20
Benzo(b)fluoranthene	30.66	2.74	0.84
Benzo(j)fluoranthene	NA	0.36	
Benzo(k)fluoranthene	30.66	0.70	0.21
Benzo(j,k)fluorene (Fluoranthene)	1.2847	24.32	0.31
Benzo(r,s,t)pentaphene	NA	NP	
Dibenz(a,h)acridine	NA	NP	
Dibenz(a,j)acridine	NA	NP	
Dibenzo(a,h)anthracene	30.66	0.43	0.13
Dibenzo(a,e)fluoranthene	NA	NP	
Dibenzo(a,e)pyrene	NA	NP	
Dibenzo(a,h)pyrene	NA	NP	
Dibenzo(a,l)pyrene	NA	NP	
7H-Dibenzo(c,g)carbazole	NA	NP	
7,12-Dimethylbenz(a)anthracene	NA	NP	
Indeno(1,2,3-cd)pyrene	30.66	0.01	0.00
3-Methylcholanthrene	NA	NP	
5-Methylchrysene	NA	3.50	
1-Nitropyrene	NA	NP	
Total			25.417

NA – Not applicable (No TWF Available).

NP – Not present.

Wood Preserving PACs

EPA used data available from wood preserving facilities to calculate TWPE for discharges of PACs from wood preserving facilities (NAICS 321114, Wood Preservation). In 2005, 10 wood preserving facilities participated in a sampling program to determine the PACs released with their stormwater runoff. Over the period of a few months, the facilities collected grab samples of runoff during rainfall events. The 10 facilities collected a total of 74 samples. In 37 of these samples, at least one PAC was measured above the detection limit. EPA used the concentrations in these 37 samples to calculate a TWF for the PACs discharged from wood preserving facilities (H.M. Rollins, 2005).

For all PAC concentrations reported as not detected, EPA assumed the concentration to be zero. Using the data provided, EPA calculated the average concentration of the six PAC compounds measured. EPA calculated the percentage of each compound relative to the total PACs. EPA calculated an adjusted TWF for each compound by multiplying its chemical-specific TWF by its percentage relative to the total PACs. EPA summed these values to calculate a new overall TWF value for PACs discharged by facilities in the wood preserving NAICS code. Table 2-13 lists TWFs for all PACs, the percent of total PACs, and the adjusted TWF for each PAC.

Table 2-13. Calculation of Toxic Weighting Factor for Wood Preserving PACs

Chemical Name	Toxic Weighting Factor	Chemical Percentage (%)	Adjusted TWF
Benzo(a)anthracene	36.2600	6.73	2.44
Benzo(a)phenanthrene(chrysene)	31.0100	9.73	3.02
Benzo(a)pyrene	100.6600	0.49	0.49
Benzo(b)fluoranthene	30.6600	4.98	1.53
Benzo(j)fluoranthene	NA	NP	NP
Benzo(k)fluoranthene	30.6600	0.78	0.24
Benzo(j,k)fluorene(fluoranthene)	1.2847	77.29	0.989
Benzo(r,s,t)pentaphene	NA	NP	NP
Dibenz(a,h)acridine	NA	NP	NP
Dibenz(a,j)acridine	NA	NP	NP
Dibenzo(a,h)anthracene	30.6600	NP	NP
Dibenzo(a,e)fluoranthene	NA	NP	NP
Dibenzo(a,e)pyrene	NA	NP	NP
Dibenzo(a,h)pyrene	NA	NP	NP
Dibenzo(a,l)pyrene	NA	NP	NP
7H-Dibenzo(e,g)carbazole	NA	NP	NP
7,12-Dimethylbez(a)anthracene	NA	NP	NP
Indeno(1,2,3-cd)pyrene	30.6600	NP	NP
3-Methylcholanthrene	NA	NP	NP
5-Methylchrysene	NA	NP	NP
1-Nitropyrene	NA	NP	NP
Total PACs TWF			8.33

NA – Not available.

NP – Not present.

Pulp, Paper, and Paperboard PACs

EPA used data available from pulp and paper mills to calculate TWPE for discharges of PACs from facilities in the Pulp, Paper, and Paperboard Category. The National Council of the Paper Industry for Air and Stream Improvement (NCASI) has provided guidance to the pulp, paper, and paperboard industry for PAC discharges (NCASI, 1988). The NCASI guidance includes a table listing the concentrations of PACs found in wastewaters for several pulping types (kraft, bisulfite, chemithermomechanical (CTMP), and thermal (TMP)). EPA determined that in the United States, there are few bisulfite, CTMP, and TMP mills compared to the number of kraft mills. Therefore, EPA used the kraft mill concentrations to calculate the PAC TWF. Since the NCASI guidance does not distinguish between effluents from mills with or without bleaching, the calculated TWF was used for mills in all pulp, paper, and paperboard ELG phases.

NCASI calculated the emission factors for the industry based on six PACs:

- Benzo(a)anthracene;
- Benzo(a)pyrene;
- Benzo(b+k) fluoranthene;
- Dibenzo(a,h)anthracene;
- Fluoranthene; and
- Indeno(1,2,3-c,d)pyrene.

For the kraft mills, only fluoranthene was detected above the method detection limit (MDL); however, four of the other five compounds were detected above the MDL for the other pulping types. Because the calculated TWF will be used for all facilities in the Pulp, Paper, and Paperboard Category, EPA used $\frac{1}{2}$ the detection limit for compounds that were not detected in kraft mill wastewaters. NCASI also calculated the emission factor using $\frac{1}{2}$ the detection limit for compounds that were not detected.

EPA used the concentrations of six PACs to calculate a Pulp, Paper, and Paperboard Category PAC TWF. EPA summed the measured concentrations to calculate the total concentration of PACs in the effluent. EPA then calculated the percentage of each chemical relative to the total PACs in the effluent. EPA calculated an adjusted TWF for each compound by multiplying its chemical-specific TWF by its percentage relative to the total PACs. EPA summed these values to calculate a new overall TWF value for PACs discharged by facilities in the Pulp, Paper, and Paperboard Category. Table 2-14 presents the TWFs for the six PACs, the percentage of total PACs, and the adjusted TWF for each PAC.

Table 2-14. Calculation of Toxic Weighting Factor for Pulp, Paper, and Paperboard PACs

Chemical Name	Toxic Weighting Factor	Chemical Percentage (%)	Adjusted TWF
Benzo(a)anthracene	36.2600	11.74	4.25
Benzo(a)pyrene	100.6600	11.74	11.81
Benzo(b+k)fluoranthene	30.6600	11.74	3.60
Benzo(j,k)fluorene(fluoranthene)	1.2847	17.84	0.229
Dibenzo(a,h)anthracene	30.6600	23.47	7.20
Indeno(1,2,3-cd)pyrene	30.6600	23.47	7.20
Total PACs TWF			33.66

2.4.4 Metal Compounds

For TRI reporting, facilities report metal compounds on a single reporting form for each parent metal and do not specify the individual compound(s) released. In addition, if the facility is required to report for a metal (e.g., zinc) and its compounds (e.g., zinc compounds), the facility may report both the metal and metal compound on a single form (reported as the metal compound). For metal compound reporting, the release quantities are based on the mass of the parent metal, only. To calculate TWPEs for metal compounds, EPA used the TWF for the parent metal. EPA then combined the TWPEs for the metal and metal compounds for ranking purposes (i.e., TWPE reported for “zinc and zinc compounds,” rather than one TWPE for “zinc” and one TWPE for “zinc compounds”). This analysis does not double count metal discharges because all discharges are separated until the rankings are created. For example, if a facility reported 5 pounds of zinc and 10 pounds of zinc compounds, the discharges would be kept separate in the database. When the rankings are created however, the database would display that the facility has one entry of 15 pounds of “zinc and zinc compounds.”

2.4.5 Determination of “Basis of Estimate” of Reported TRI Releases

When reporting releases and transfers to TRI, facilities also indicate the basis for their estimate using six reporting codes:

- M1: continuous monitoring data or measurements;
- M2: periodic or random monitoring data or measurements;
- C: mass balance calculations, such as calculation of the amount of the toxic chemical in streams entering and leaving process equipment;
- E: published emission factors;
- E2: site-specific emission factors; and
- O: other approaches, such as engineering calculations.

EPA developed a table in *TRICalculations2007* that contains the basis of estimate for direct discharges and indirect discharges (i.e., transfers to POTWs). This table is separate from the “TRI Master List” table. EPA used this table in *TRIReleases2007* to summarize how releases are reported for certain NAICS codes and point source categories.

2.5 *TRIReleases2007*

As the final step in developing *TRIReleases2007*, EPA grouped discharges from the “TRI Master List” table to create the point source category rankings and to perform other analyses. The remainder of this subsection describes the development of *TRIReleases2007* and discusses preliminary results in the following order:

- Section 2.5.1 discusses the NAICS/Point Source Category Crosswalk; and
- Section 2.5.2 describes the development of the 2007 TRI rankings, including analysis of facilities with the highest TWPE, pollutants with the highest TWPE, and category prioritization.

Table 2-15 lists the database tables that EPA created in *TRIReleases2007*.

Table 2-15. Tables Created in *TRIReleases2007*

Table Name	Description
“Counts of Facilities by NAICS”	Includes counts of direct dischargers, indirect dischargers, facilities that discharge both directly and indirectly, total dischargers, and total facilities reporting to TRI by NAICS code.
“Counts of Facilities by PSC”	Similar to table “Counts of Facilities by NAICS”; however, it reports the counts by point source category.
“Point Source Rankings”	Presents rankings for all point source categories based on calculated TWPEs. TWPEs were calculated using the total discharges to surface water by direct dischargers and transfers to POTWs by indirect dischargers, taking into account pollutant removal occurring at the POTWs.
“NAICS Code Rankings”	Presents rankings for all NAICS codes based on calculated TWPEs. TWPEs were calculated using the total discharges to surface water by direct dischargers and transfers to POTWs by indirect dischargers, taking into account pollutant removal occurring at the POTW.

EPA also imported or linked the following tables from *TRICalculations2007*:

- “Dioxin Distributions”;
- “NAICS_Codes”;
- “Parent Metals and Compounds”;
- “Pesticide Chemical List”;
- “PSC Codes”;
- “PSC/NAICS Crosswalk”;
- “TRI Master List”;
- “TRI Master Facility List”; and
- “TWFs.”

2.5.1 NAICS/Point Source Category Crosswalk

EPA has developed ELGs for 56 specific categories of industrial dischargers. The categories, which may be divided into subcategories, are generally defined in terms of combinations of products made and the processes used to make these products. Facilities with data in TRI are identified by NAICS code. Thus, to use TRI data to estimate the pollutants discharged by each point source category, EPA assigned each 6-digit NAICS code to an appropriate point source category using the “NAICS/Point Source Category Crosswalk” table. Section 1 of this report discusses the crosswalk in more detail.

2.5.2 Development of 2007 TRI Rankings

Figure 2-2 presents the *TRIReleases2007* database structure, including fields used from each data source. The NAICS codes in the “TRI Master List” table are specific to each facility and each discharge. This allows EPA to make NAICS adjustments to differentiate between various operations at one facility. The default NAICS code is the primary facility NAICS code reported in TRI. For the development of the rankings, EPA associated the NAICS codes with the appropriate point source categories using the “NAICS/Point Source Category Crosswalk” and the “Point Source Category Codes” tables. The TWPE for each discharge was calculated previously in *TRICalculations2007* (see Section 2.4).

TRIReleases2007 groups releases by chemical, facility, and point source category to allow EPA to perform the following analyses.

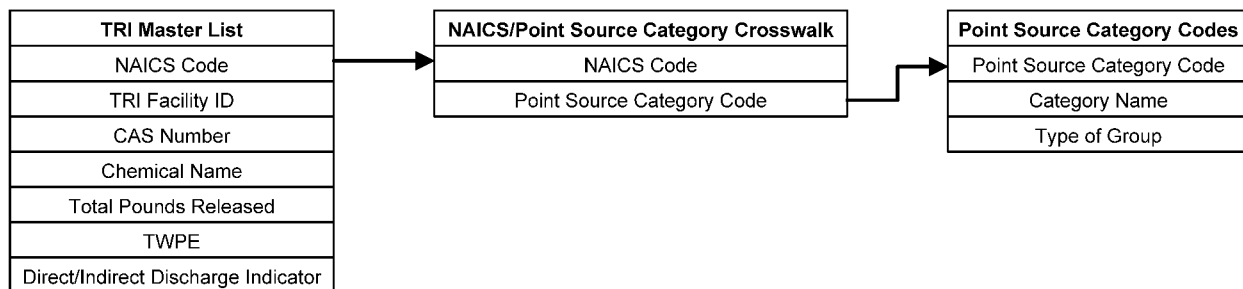


Figure 2-2. Basic Structure of the *TRIReleases2007* Database

Top Facilities Analysis. EPA created a table that ranks facilities according to the TWPE discharged by the entire facility. This table also identifies the chemical that contributed the greatest amount of TWPE to the total facility TWPE. EPA used the table to identify facilities with unusually high reported discharges relative to other facilities in an industrial category. As discussed in Section 6, EPA contacted these facilities to learn more about their reported releases. Section 6 also presents EPA’s findings about the top facilities’ reported releases.

Top Pollutants Analysis. EPA created a table that ranks pollutants discharged according to the TWPE discharged by all facilities reporting in *TRIReleases2007*. The table also includes the number of facilities that report releasing the chemical. Using this analysis, EPA identified pollutants or pollutant categories for further analysis (e.g., metals).

Category Prioritization. EPA uses point source category rankings to identify categories that may warrant further review.

2.6 Results of the Preliminary Analysis of the *TRIReleases2007* Database

This section presents the results of the analysis of *TRIReleases2007* database. Table 2-16 presents the point source category rankings by TWPE. Table A-1 in Appendix A presents the six-digit NAICS code rankings by TWPE. Table A-2 in Appendix A presents the total TWPE for chemicals in TRI. See Section 5 of the 2009 TSD for EPA's 2009 annual review (U.S. EPA, 2009).

Table 2-16. Point Source Category Rankings

40 CFR Part	Point Source Category	Number of Facilities	Total Discharge before POTW Removal	Total Pounds Released ^b	TWPE
414.1 ^a	Chlorine And Chlorinated Hydrocarbons	28	1,500,000	835,000	7,270,000
414	Organic Chemicals, Plastics And Synthetic Fibers	594	72,500,000	19,200,000	575,000
423	Steam Electric Power Generating	284	2,160,000	2,150,000	542,000
430	Pulp, Paper And Paperboard	198	34,900,000	15,800,000	460,000
419	Petroleum Refining	232	16,600,000	13,700,000	172,000
420	Iron And Steel Manufacturing	190	41,500,000	39,500,000	104,000
433	Metal Finishing	2047	25,800,000	3,980,000	62,000
415	Inorganic Chemicals Manufacturing	142	26,900,000	5,870,000	54,700
440	Ore Mining And Dressing	28	324,000	319,000	44,400
421	Nonferrous Metals Manufacturing	107	3,560,000	2,670,000	38,900
432	Meat and Poultry Products	144	45,100,000	41,400,000	35,900
458	Carbon Black Manufacturing	7	356	356	32,400
455	Pesticide Chemicals	67	2,250,000	1,450,000	24,700
429	Timber Products Processing	107	210,000	32,500	16,300
417	Soap And Detergent Manufacturing	58	675,000	69,300	14,600
NA	National Security & International Affairs	43	15,000,000	14,900,000	14,500
471	Nonferrous Metals Forming And Metal Powders	105	12,200,000	1,330,000	8,830
463	Plastics Molding And Forming	121	15,000,000	2,140,000	8,780
439	Pharmaceutical Manufacturing	96	5,750,000	1,510,000	8,000
428	Rubber Manufacturing	182	1,880,000	865,000	7,860
425	Leather Tanning And Finishing	19	634,000	318,000	7,800
469	Electrical And Electronic Components	87	11,300,000	3,210,000	7,550
NA	Miscellaneous Foods And Beverages	133	9,520,000	5,810,000	6,580
464	Metal Molding And Casting (Foundries)	184	1,690,000	204,000	6,110
468	Copper forming	116	288,000	35,500	4,950
NA	Tobacco Products	21	203,000	189,000	4,760
418	Fertilizer Manufacturing	29	3,240,000	3,190,000	4,460
437	Centralized Waste Treatment	34	2,340,000	448,000	3,790
413	Electroplating	352	8,670,000	886,000	3,210

Table 2-16. Point Source Category Rankings

40 CFR Part	Point Source Category	Number of Facilities	Total Discharge before POTW Removal	Total Pounds Released ^b	TWPE
407	Canned And Preserved Fruits And Vegetables Processing	20	4,370,000	3,760,000	2,960
467	Aluminum forming	115	2,000,000	304,000	2,710
436	Mineral Mining And Processing	60	2,410,000	1,800,000	2,420
405	Dairy products processing	243	20,700,000	3,170,000	2,400
410	Textile Mills	63	2,830,000	1,170,000	2,390
406	Grain mills	23	10,700,000	1,800,000	2,080
461	Battery Manufacturing	62	1,180,000	120,000	1,640
438	Metal Products And Machinery	32	116,000	15,700	917
426	Glass Manufacturing	64	1,510,000	185,000	546
434	Coal Mining	14	245,000	245,000	493
411	Cement Manufacturing	36	27,900	3,410	452
424	Ferroalloy Manufacturing	4	2,350	2,300	340
422	Phosphate Manufacturing	11	16,200	16,100	250
443	Paving And Roofing Materials (Tars And Asphalt)	19	1,330	227	249
465	Coil Coating	50	67,300	21,600	241
408	Canned And Preserved Seafood Processing	8	312,000	312,000	234
466	Porcelain Enameling	5	3,430	2,180	164
446	Paint Formulating	49	1,130,000	91,500	140
NA	Printing & Publishing	65	370,000	31,800	110
445	Landfills	13	69,500	22,400	82.7
NA	Justice, Public Order, & Safety	1	31.2	31.2	69.9
454	Gum And Wood Chemicals Manufacturing	10	3,020	507	54.8
444	Waste Combustors	8	18,300	18,300	39.6
NA	Independent And Stand Alone Labs	7	9,660	2,930	30.0
409	Sugar Processing	3	72,900	23,700	25.5
447	Ink Formulating	8	4,500	573	20.0
457	Explosives Manufacturing	9	17,300	16,200	13.6
NA	Apparel & Other Textile Products	2	6,710	4,090	4.61
NA	Miscellaneous Retail	1	7	1.58	3.54
NA	Wholesale Trade- Nondurable Goods	1	44,600	4,460	3.33
NA	Wholesale Trade- Durable Goods	5	2,990	307	2.51
NA	Coal Mining	1	16.6	16.6	0.458
NA	Engineering & Management Services	1	720	371	0.441
NA	Business Services	2	95	9.46	0.294
NA	Drinking Water Treatment	2	681	171	0.29
NA	Trucking & Warehousing	1	66	40.3	0.0447

Table 2-16. Point Source Category Rankings

40 CFR Part	Point Source Category	Number of Facilities	Total Discharge before POTW Removal	Total Pounds Released ^b	TWPE
NA	Misc. Manuf. Industries	1	5	5	0.0281
NA	Food & Kindred Products	1	0.004	0.000784	0.00013

Source: *TRIReleases2007_v2*.

^a 414.1 refers to the chlorinated hydrocarbon segment of the Organic Chemicals, Plastics, and Synthetic Fibers Category (40 CFR Part 414) and the Chlor-Alkali Subcategory of the Inorganic Chemicals Manufacturing Category (40 CFR Part 415).

^b Discharges include transfers to POTWs and account for POTW removals.

NA – Not applicable; no existing ELGs apply to discharges.

2.6.1 Metals Analysis

For the 2009 screening-level analysis, EPA gave special consideration to reported discharges of metals. Releases of metals from industrial facilities may be associated with current operations or may be from cleanup actions for past practices. If releases are not related to current operations, they are not useful in reviewing the ELGs intended to control discharges from current operations. EPA identified the following metals for further analysis as part of the 2009 annual review, based on total TWPE calculated by *TRIReleases2007*:

- Manganese;
- Arsenic; and
- Copper.

Table 2-17 presents all the metals reported in TRI 2007 ranked by TWPE, including the number of facilities reporting discharges and the pounds discharged. In 2007, 4,428 facilities reported discharging 17 metals⁵. The total metals discharges after accounting for POTW removals, as appropriate, was 1,240,000 TWPE, which represented 12.9 percent of total TRI TWPE for 2007. Manganese discharges were the largest metals discharges, as measured by TWPE, accounting for almost 25 percent of the total metals TWPE. Arsenic and copper were also significant contributors, with discharges of each accounting for greater than 18 percent of the total metals TWPE.

⁵ TRI 2007 includes release information for the following metals, including their metal compounds: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, and zinc.

Table 2-17. Metals Discharged by TWPE in TRI 2007

Chemical Name	Number of Facilities	Total Pounds Released ^a	TWPE after POTW Removals (lb-eq/yr)	TWPE percent of Total Metals TWPE	TWPE percent of Nationwide TWPE
Manganese and Manganese Compounds	965	4,330,000	305,000	24.7	3.19
Arsenic and Arsenic Compounds	145	55,800	226,000	18.2	2.36
Copper and Copper Compounds	1,688	354,000	225,000	18.1	2.35
Lead and Lead Compounds	2,401	77,000	173,000	13.9	1.80
Mercury and Mercury Compounds	331	790	92,500	7.48	0.97
Zinc and Zinc Compounds	1,297	865,000	40,600	3.28	0.42
Selenium and Selenium Compounds	49	32,000	35,800	2.89	0.37
Silver and Silver Compounds	42	2,170	35,700	2.88	0.37
Cadmium and Cadmium Compounds	46	1,420	32,900	2.66	0.34
Nickel and Nickel Compounds	1,368	254,000	27,600	2.23	0.29
Cobalt and Cobalt Compounds	204	194,000	22,100	1.79	0.23
Vanadium and Vanadium Compounds	148	376,000	13,200	1.06	0.14
Chromium and Chromium Compounds	1,144	74,600	5,650	0.46	0.06
Barium and Barium Compounds	353	860,000	1,710	0.14	0.02
Thallium and Thallium Compounds	10	1,630	1,680	0.14	0.02
Antimony and Antimony Compounds	163	19,600	240	0.02	0.003
Beryllium and Beryllium Compounds	10	89.9	95.0	0.008	0.001
Total	4,428	7,490,000	1,240,000	100	12.9

Source: *TRIReleases2007_v2*.^a Discharges include transfers to POTWs and account for POTW removals.

Table 2-18 lists the facilities reporting discharges of greater than 6,000 TWPE of manganese, arsenic, or copper in TRI 2007.

Manganese is commonly found in discharges from pulp and paper facilities. All but one of the top facilities (Tronox, LLC) discharging manganese are pulp and paper mills. In the Final Report on the Pulp, Paper, and Paperboard Detailed Study (U.S. EPA, 2006), EPA identified manganese and aluminum as the top metals of concern from pulp and paper mills. EPA reviewed manganese discharges from Tronox LLC as part of the 2009 annual review (Freeze, 2009a; Freeze, 2009b) and determined that manganese in the discharges from Tronox LLC originated in the titanium dioxide manufacturing process onsite known as the chloride process (see Section 7 of the *Preliminary 2010 Effluent Guidelines Program Plan Technical Support Document* (U.S. EPA, 2009)). Of the 17 metals reported to TRI, manganese is ranked 14th in terms of relative toxicity. Manganese TWPE discharges contributed 24.7 percent to the total metals TWPE to TRI in 2007.

Table 2-18. Facilities Reporting Discharges of Metals with the Highest TWPE in TRI 2007

Chemical	Facility	Point Source Category	CFR Citation	Total TWPE (lb-eq/yr)
Manganese and Manganese Compounds	Domtar Industries Inc. Ashdown Mill	Pulp, Paper and Paperboard	40 CFR Part 430	15,700
	Rayonier Performance Fibers Jesup Mill	Pulp, Paper and Paperboard	40 CFR Part 430	8,450
	Alabama River Pulp Co In C.	Pulp, Paper and Paperboard	40 CFR Part 430	8,450
	Tronox LLC	Inorganic Chemicals Manufacturing	40 CFR Part 415	8,110
	Brunswick Cellulose Inc	Pulp, Paper and Paperboard	40 CFR Part 430	7,750
	Georgia-Pacific Crossett Operations	Pulp, Paper and Paperboard	40 CFR Part 430	7,350
	Meadwestvaco Texas L.P.	Pulp, Paper and Paperboard	40 CFR Part 430	7,160
	Georgia-Pacific Consumer Products LP	Pulp, Paper and Paperboard	40 CFR Part 430	6,830
	Bowater Inc -Catawba Operations	Pulp, Paper and Paperboard	40 CFR Part 430	6,740
	Georgia-Pacific Consumer Products LLC	Pulp, Paper and Paperboard	40 CFR Part 430	6,470
	Georgia-Pacific Brewton LLC	Pulp, Paper and Paperboard	40 CFR Part 430	6,000
Arsenic and Arsenic Compounds	Chesterfield Power Station	Steam Electric Power Generating	40 CFR Part 423	18,200
	U.S. TVA Johnsonville Fossil Plant	Steam Electric Power Generating	40 CFR Part 423	17,000
	U.S. TVA Widows Creek Fossil Plant	Steam Electric Power Generating	40 CFR Part 423	15,800
	Duke Energy Corp Wabash River Generating Station	Steam Electric Power Generating	40 CFR Part 423	13,700
	U.S. TVA Kingston Fossil Plant	Steam Electric Power Generating	40 CFR Part 423	10,900
	Detroit Edison Monroe Power Plant	Steam Electric Power Generating	40 CFR Part 423	9,700
	Gaston Steam Plant	Steam Electric Power Generating	40 CFR Part 423	9,300
	Kentucky Utilities Co. - E. W. Brown Station	Steam Electric Power Generating	40 CFR Part 423	9,110
	Kentucky Utilities Co Ghent Station	Steam Electric Power Generating	40 CFR Part 423	8,850
	Eastman Chemical Co Tennessee Operations	Organic Chemicals, Plastics and Synthetic Fibers	40 CFR Part 414	8,810
	American Electric Power Cardinal Plant	Steam Electric Power Generating	40 CFR Part 423	8,490
	Barry Steam Plant	Steam Electric Power Generating	40 CFR Part 423	8,080
	Cliffside Steam Station	Steam Electric Power Generating	40 CFR Part 423	6,540

Table 2-18. Facilities Reporting Discharges of Metals with the Highest TWPE in TRI 2007

Chemical	Facility	Point Source Category	CFR Citation	Total TWPE (lb-eq/yr)
Copper and Copper Compounds	Great River Energy Stanton Station	Steam Electric Power Generating	40 CFR Part 423	12,700
	Georgia Power Scherer Steam Electric Generating Plant	Steam Electric Power Generating	40 CFR Part 423	10,800
	Chesterfield Power Station	Steam Electric Power Generating	40 CFR Part 423	10,200
	Bowen Steam Electric Generating Plant	Steam Electric Power Generating	40 CFR Part 423	7,620
	U.S. TVA Paradise Fossil Plant	Steam Electric Power Generating	40 CFR Part 423	6,980
	American Electric Power Kammer / Mitchell Plants	Steam Electric Power Generating	40 CFR Part 423	6,380

Source: TRI Releases 2007_v2.

Arsenic and copper are commonly found in discharges from steam electric power generating facilities. In EPA's analysis of pollutants found in discharges from the steam electric industry, EPA found that arsenic and copper are two of the top pollutants reported to PCS/ICIS-NPDES and TRI. All but one of the top facilities (Eastman Chemical Co Tennessee Operations) discharging arsenic are steam electric power generating facilities. Of the 17 metals reported to TRI, arsenic is ranked 4th in terms of relative toxicity. Arsenic TWPE discharges contributed 18.2 percent to the total metals TWPE. All of the top facilities discharging copper are steam electric power generating facilities. Of the 17 metals reported to TRI, copper is ranked 9th in terms of relative toxicity. Copper TWPE discharges contributed 18.1 percent to the total metals TWPE.

Conclusions

- A total of 4,428 facilities reported discharging 7,490,000 pounds, including transfers to POTWs and accounting for POTW removals, and 1,240,000 TWPE of metals, accounting for 12.9 percent of total nationwide TRI 2007 TWPE.
- Manganese, arsenic, and copper are the metals with the highest TWPE contributions to the total nationwide metals TRI 2007 TWPE.
- All but one of the top 11 facilities discharging manganese (ranked by TWPE) are pulp and paper mills.
- All but one of the top 13 facilities discharging arsenic (ranked by TWPE) are steam electric power generating facilities.
- All of the top 6 facilities discharging copper (ranked by TWPE) are steam electric power generating facilities.

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3. *DMRLOADS2007: DEVELOPMENT AND CATEGORY RANKINGS*

As discussed in Section 1, EPA annually reviews promulgated effluent limitations guidelines and pretreatment standards (ELGs) and investigates available information on industrial pollutant discharges. EPA identified that the discharge monitoring reports (DMRs) in the Permit Compliance System (PCS) and the Integrated Compliance Information System for the National Pollutant Discharge Elimination System (ICIS-NPDES) contain readily available and relevant data on industrial pollutant discharges to surface waters (“direct discharges”). Neither PCS nor ICIS-NPDES has information on pollutant discharges to Publicly Owned Treatment Works (POTWs) (“indirect discharges”). Consequently, EPA was able to use DMR data in PCS and ICIS-NPDES for its review of: (1) promulgated effluent guidelines (“direct discharges”); and (2) direct industrial pollutant discharges not currently subject to effluent guidelines. Due to the limitations of PCS and ICIS-NPDES, EPA was unable to use these two data systems to review promulgated pretreatment standards or indirect industrial pollutant discharges not currently subject to pretreatment standards. As discussed in Section 7, EPA combined the toxic-weighted pound equivalent (TWPE) calculated from the DMR data contained in PCS and ICIS-NPDES and Toxics Release Inventory (see Section 2 for information about TRI). EPA used this combined TWPE to prioritize its review of industry sectors to offer the greatest potential for reducing hazard to human health or the environment.

This section describes how EPA compiled DMR data from PCS and ICIS-NPDES into the database *DMRLoads2007* to estimate the mass and relative toxicity of pollutants discharged by industry categories. *DMRLoads2007* compiles information for all facilities classified as major dischargers in PCS and ICIS-NPDES for reporting year 2007 and for the point source categories that these facilities represent. Tables B-1 and B-2 in Appendix B list annual loads and TWPE calculated by *DMRLoads2007* presented by 4-digit Standard Industrial Classification (SIC) code and pollutant, respectively. The remainder of Section 3 is organized in the following subsections:

- Section 3.1 - Overview of *DMRLoads2007*;
- Section 3.2 - *DMRLoads2007*: Database Development and Methodology;
- Section 3.3 - Results of the Preliminary Analysis;
- Section 3.4 - Data Quality Review; and
- Section 3.5 - *DMRLoads2007* References.

3.1 Overview of *DMRLoads2007*

EPA’s Office of Enforcement and Compliance Assistance (OECA) stores DMR data in national databases. EPA has used these DMR data as a part of its screening level review of existing effluent guidelines since the 2003 annual review (68 FR 75515, December 31, 2003). Historically, OECA stored DMR data in PCS, but in 2006 began storing certain states’ data in ICIS-NPDES. Therefore the 2009 annual review of nationwide discharges required two sets of data, which EPA merged to create *DMRLoads2007*.

3.1.1 *NPDES Permitting and Reporting Requirements*

As authorized by the CWA, the NPDES program controls water pollution by regulating point sources that discharge pollutants directly into waters of the United States. Specifically, Federal Water Pollution Control Act Title IV, Permits and Licenses, of the Federal Water Pollution Control Act created the NPDES system for permitting wastewater discharges (CWA

Section 402). The Water Permits Division within EPA's Office of Wastewater Management leads and manages the NPDES permit program in partnership with EPA Regional Offices, states, tribes, and other stakeholders. Industrial, municipal, and other facilities must obtain NPDES permits if they discharge directly to surface waters. In most cases, authorized states administer the NPDES permit program.

More than 65,000 industrial facilities and municipal wastewater treatment plants have obtained permits for discharges of regulated pollutants. Permitted facilities are required to file DMRs that include permit monitoring data (e.g., pollutant concentration/quantity, flow) to the appropriate regulating authority. The majority of NPDES permits are issued to direct point source dischargers (i.e., those entities that discharge directly into the receiving water body). PCS and ICIS-NPDES contain only limited data for indirect dischargers (i.e., those entities that discharge to POTWs).

To provide an initial framework for setting permit issuance priorities, EPA developed a major/minor classification system for industrial and municipal wastewater dischargers. Facilities are classified as major based on an assessment of six characteristics:

1. Toxic pollutant potential;
2. Flow/stream flow volume;
3. Conventional pollutant loading;
4. Public health impact;
5. Water quality factors; and
6. Proximity to coastal waters.

Each permitting authority establishes its own specific definitions based on the above characteristics, but major dischargers have the capability to impact receiving waters if not controlled, and, therefore, receive more regulatory attention than minor dischargers. DMR data for approximately 6,600 major facilities are in PCS and ICIS-NPDES for 2007.

Facilities with major discharges must demonstrate compliance with NPDES permit limits by submitting monthly DMRs to the permitting authority. The permitting authority enters the reported DMR data into PCS or ICIS-NPDES, including the type of violation (if any), measured concentration and quantity values, and Quarterly Non-Compliance Report indicators. EPA does not require permitting authorities to enter DMR data for minor dischargers into PCS and ICIS-NPDES. Therefore, these databases contain only very limited data for minor dischargers.

Table 3-1 identifies states and territories with data in PCS versus ICIS-NPDES at the time *DMRLoads2007* was created. Note that three states were in the process of migrating from PCS to ICIS-NPDES in 2007 and had data in both systems. EPA created the database *DMRLoads2007* to combine the two systems (PCS and ICIS-NPDES) and generate industrial category rankings for all U.S. states and territories.

Table 3-1. States and Territories Included in DMRLoads2007

State/Province ^a	Database	State/Territory ^a	Database
Alabama	PCS	Montana	ICIS-NPDES
Alaska	ICIS-NPDES	Mississippi	PCS
American Samoa	ICIS-NPDES	North Dakota	PCS
Arizona	PCS	Nebraska ^b	ICIS-NPDES / PCS
Arkansas ^c	PCS	North Carolina	PCS
California	PCS	New Hampshire	ICIS-NPDES
Colorado	PCS	New Jersey	PCS
Connecticut	ICIS-NPDES	New Mexico	ICIS-NPDES
Delaware	PCS	New York	ICIS-NPDES
District of Columbia	ICIS-NPDES	Nevada	ICIS-NPDES
Florida	PCS	Ohio	PCS
Georgia	ICIS-NPDES	Oklahoma	PCS
Guam	ICIS-NPDES	Oregon	PCS
Hawaii	ICIS-NPDES	Pennsylvania	ICIS-NPDES
Idaho	ICIS-NPDES	Rhode Island	ICIS-NPDES
Illinois ^b	ICIS-NPDES / PCS	South Carolina	PCS
Indiana	ICIS-NPDES	South Dakota	ICIS-NPDES
Iowa	PCS	Puerto Rico	ICIS-NPDES
Kansas	PCS	Tennessee	PCS
Kentucky	PCS	Texas	PCS
Louisiana	PCS	Utah	ICIS-NPDES
Maine	PCS	Vermont	PCS
Maryland	ICIS-NPDES	Virgin Islands of the U.S.	ICIS-NPDES
Massachusetts	ICIS-NPDES	Virginia	PCS
Michigan	PCS	Washington	PCS
Minnesota	PCS	Wisconsin	PCS
Missouri	PCS	West Virginia	PCS
Northern Mariana Islands	ICIS-NPDES	Wyoming	PCS

^a 2007 DMR data were not available for the following territories/tribes and were not included in *DMRLoads2007*: Atlantic Offshore, Canal Zone, Federal Micronesia, George's bank, Gulf of Mexico East, Johnson Atoll, Marshall Islands, Midway Islands, Palau, Saint Regis Tribe, Trust Territory, and U.S. Minor Islands.

^b Indicates states that were in the process of migrating from PCS to ICIS-NPDES in the year 2007. Some facilities in these states have DMR data in either PCS or ICIS-NPDES, while some facilities have DMR data in both PCS and ICIS-NPDES. For facilities with data in both databases for 2007, EPA used the DMR data from ICIS-NPDES (see Section 3.2.4.1).

^c Indicates states that had DMR data in PCS for 2007 and have since migrated their DMR data to ICIS-NPDES.

3.1.2 Overview of PCS and ICIS-NPDES

Both PCS and ICIS-NPDES automate entering, updating, and retrieving NPDES data and tracking permit issuance, permit limits, monitoring data, and other data pertaining to facilities regulated by the NPDES program. Major dischargers are required to submit effluent monitoring data to the permitting authority on DMR. The permitting authority then enters these data into PCS or ICIS-NPDES and evaluates them for compliance with the NPDES permit requirements.

Permit limits include water quality parameters (e.g., dissolved oxygen and temperature), specific chemicals (e.g., phenol), bulk parameters (e.g., biochemical oxygen demand), and flow. Facilities report pollutant discharges in their DMR as mass-based quantities and/or concentrations using a wide variety of units. PCS and ICIS-NPDES also include information on the facility's permit requirements, such as monitoring frequency.

3.1.2.1 Utility of PCS and ICIS-NPDES

The data stored in PCS and ICIS-NPDES are particularly useful for the annual review process for the following reasons:

- PCS and ICIS-NPDES are national in scope, including data from all 50 states and 19 U.S. territories/tribes⁶;
- Discharge reports included in PCS and ICIS-NPDES are based on effluent chemical analysis and metered flow;
- PCS and ICIS-NPDES collectively include direct discharging facilities in all point source categories; and
- PCS and ICIS-NPDES include data on conventional pollutants for most facilities and for the nutrients nitrogen and phosphorous for many facilities.

3.1.2.2 Limitations of PCS and ICIS-NPDES

Limitations of the data collected in the PCS and ICIS-NPDES databases include the following:

- The databases contain data only for pollutants a facility is required by permit to monitor; the facility is not required to monitor or report all pollutants actually discharged.
- The databases include very limited discharge monitoring data from minor dischargers.
- The databases include very limited data characterizing indirect discharges from industrial facilities to POTWs.
- Many of the pollutant parameters included in PCS and ICIS-NPDES are not chemical compounds (e.g., “total Kjeldahl Nitrogen,” “oil and grease”) and cannot have toxic weighting factors (TWFs).
- In some cases, the databases identify the type of wastewater being discharged; however, most reported flow rates do not indicate the type of wastewater and therefore, total flow rates reported to PCS and ICIS-NPDES may include stormwater and noncontact cooling water, as well as process wastewater.
- Facilities are identified by SIC code, not point source category. For some SIC codes, it may be difficult or impossible to identify the point source category that is the source of the reported wastewater discharges⁷.

⁶ The following territories' data/regions are not available in PCS or ICIS-NPDES for 2007: Atlantic Offshore, Canal Zone, Federal Micronesia, George's Bank, Gulf of Mexico East, Johnson Atoll, Marshall Islands, Midway Islands, Palau, Saint Regis Tribe, Trust Territory, and U.S. Minor Islands.

⁷ ICIS-NPDES includes a data field for entering the applicable ELG (i.e. 40 CFR Part 423 for the Steam Electric Power Generating Category). However, entering data into this field is not required and therefore this field is typically not populated.

- Some facilities in PCS and ICIS-NPDES do not provide information on applicable SIC codes. Additionally, facilities in PCS do not provide information on applicable North American Industrial Classification System (NAICS) codes, while only a few facilities in ICIS-NPDES provide information on applicable NAICS codes.
- Although facilities may provide more than one SIC code to describe their operations, EPA uses only the primary SIC code to classify facilities.
- PCS and ICIS-NPDES were designed as permit compliance tracking systems and do not contain production information.
- DMR data may be entered into the PCS or ICIS-NPDES database manually, which leads to data-entry errors.

Despite the limitations and constraints of the PCS and ICIS-NPDES databases, EPA has determined that they are appropriate for an initial screening-level review and prioritization of the pollutant loads discharged by industrial categories. EPA will further evaluate the prioritized categories in a second level of review, which may include additional data collection and additional verification of data reported in PCS and ICIS-NPDES.

3.1.3 PCS and ICIS-NPDES Data Structure

The PCS and ICIS-NPDES databases contain more than 5 million records organized by individual permit files. Each permit file contains information about the following elements:

- The permit and the permitted facility, including permit number, dates of issue and expiration, facility name, location, and type of facility;
- Permit events, including date application was received, scheduled, and achieved dates for completion of compliance schedule;
- Identity of outfalls within the facility and a description of the associated monitoring requirements;
- Parameters to be measured at each outfall and the corresponding limitations; and
- Inspections performed at the facility, such as type of inspection, inspector identity, and inspector comments.

To develop *DMRLoads2007*, EPA developed two pollutant loading tools: the database *PCSLoadCalculator2007* and the ICIS-NPDES Pollutant Loading Tool. These loading tools start with DMR data stored in their respective databases and use similar methodologies to calculate annual mass discharges from DMR data. PCS and ICIS-NPDES store data in a series of tables. Table 3-2 lists the PCS and ICIS-NPDES data types that EPA used to create *DMRLoads2007*. EPA uses data in the Permit Facility, Pipe Schedule, Measurement Violation, and Permit Event data types to develop *PCSLoadCalculator2007*. In ICIS-NPDES, these types of data are stored in several relational database tables, also shown in Table 3-2. In addition to the four data types used to develop *PCSLoadCalculator2007*, EPA also used data in the Parameter Limits data type to develop the ICIS-NPDES Pollutant Loading Tool. EPA did not use the following nine data types in PCS and ICIS-NPDES in developing its load calculators:

- Compliance schedule data;
- Enforcement action data;
- Evidentiary hearing data;

Table 3-2. Data Types in PCS and ICIS-NPDES Used for DMRLoads2007 Development

PCS Data Type	Description	Included in PCSLoadCalculator2007	Relational Tables used in ICIS NPDES Pollutant Loading Tool
Permit-Facility Data	General descriptive information on each permitted facility (such as its name, address, classification and design flow rate). It contains the basic information regarding a permit, permit-facility data is the one data type that belongs to all of the families of logically related data types.	Yes	Facility interest Permit Facility interest SIC Facility interest NAICs
Pipe-Schedule Data	Detailed information describing each outfall within a permitted facility and the discharge monitoring requirements associated with each (such as effluent waste types, treatment types, and limit start and end dates-initial, interim, or final).	Yes	Permitted Feature Permitted Feature Coordinates
Parameter-Limits Data	Detailed information specifying the monitoring requirements associated with each outfall within a permitted facility (such as monitoring location, the parameter to be monitored, the required frequency of analysis, the units in which the measurements are expressed, and the quantity and concentration limits for each parameter).	No	Limit Limit Set Limit Set Schedule Limit Value
Measurement-Violation Data	Detailed information on the reported measurement values for effluent parameters including those that are in violation of established limits for the permit, the type of violation, the reported number of excursions, the actual measurement values, and the percentage by which a measurement exceeds quantity and/or concentration limits.	Yes	DMR DMR Event DMR Form DMR Form Parameter DMR Form Value DMR Parameter DMR Value REF_Parameter
Permit Events Data	Information tracking the events relating to the issuance of a permit, from initial receipt of the application for a permit through actual permit issuance.	Yes	Permit

Source: Permit Compliance System Generalized Retrieval Training Manual, Table 1-1, pg 1-4 (U.S. EPA, 2001); Results of ICIS-NPDES Pollutant Loading Tool Convert Module Development and DMR Data Review – Update 1 (Camp, 2009).

- Grant data;
- Inspection data;
- Inspection scheduling data;
- Pretreatment audit/PCI data;
- Pretreatment performance data; and
- Schedule violation data.

3.2 DMRLoads2007: Database Development and Methodology

To develop *DMRLoads2007*, EPA developed two pollutant loading tools: the database *PCSLoadCalculator2007* and the ICIS-NPDES Pollutant Loading Tool. These loading tools start with DMR data stored in their respective databases and use similar methodologies to calculate annual mass discharges from DMR data. Due to differences in the PCS and ICIS-NPDES data structures, EPA's analysis required two separate loading tools – one for PCS and one for ICIS-NPDES⁸. EPA created *DMRLoadsAnalysis2007* to merge data from the two systems, evaluate the impacts of calculation assumptions, and track database corrections. EPA also created *DMRNutrients2007* to evaluate point source discharges of nitrogen and phosphorus.

The remainder of this subsection describes the methodology and assumptions used in creating the *DMRLoads2007* database to generate point source category rankings:

- Section 3.2.1 describes the data sources used to create *DMRLoads2007*;
- Section 3.2.2 describes *PCSLoadCalculator2007*;
- Section 3.2.3 describes the ICIS-NPDES Pollutant Loading Tool;
- Section 3.2.4 describes *DMRLoadsAnalysis2007*;
- Section 3.2.5 describes *DMRNutrients2007*; and
- Section 3.2.6 describes *DMRLoads2007*.

3.2.1 *Data Sources used in the Development of DMRLoads2007*

Figure 3-1 shows the relationship between PCS, ICIS-NPDES, and *DMRLoadsAnalysis2007*, *DMRNutrients2007*, and *DMRLoads2007*.

⁸ In future years of DMR data analysis, the ICIS NPDES Pollutant Loading Tool functions will include PCS load calculations, and only one loading tool will be required.

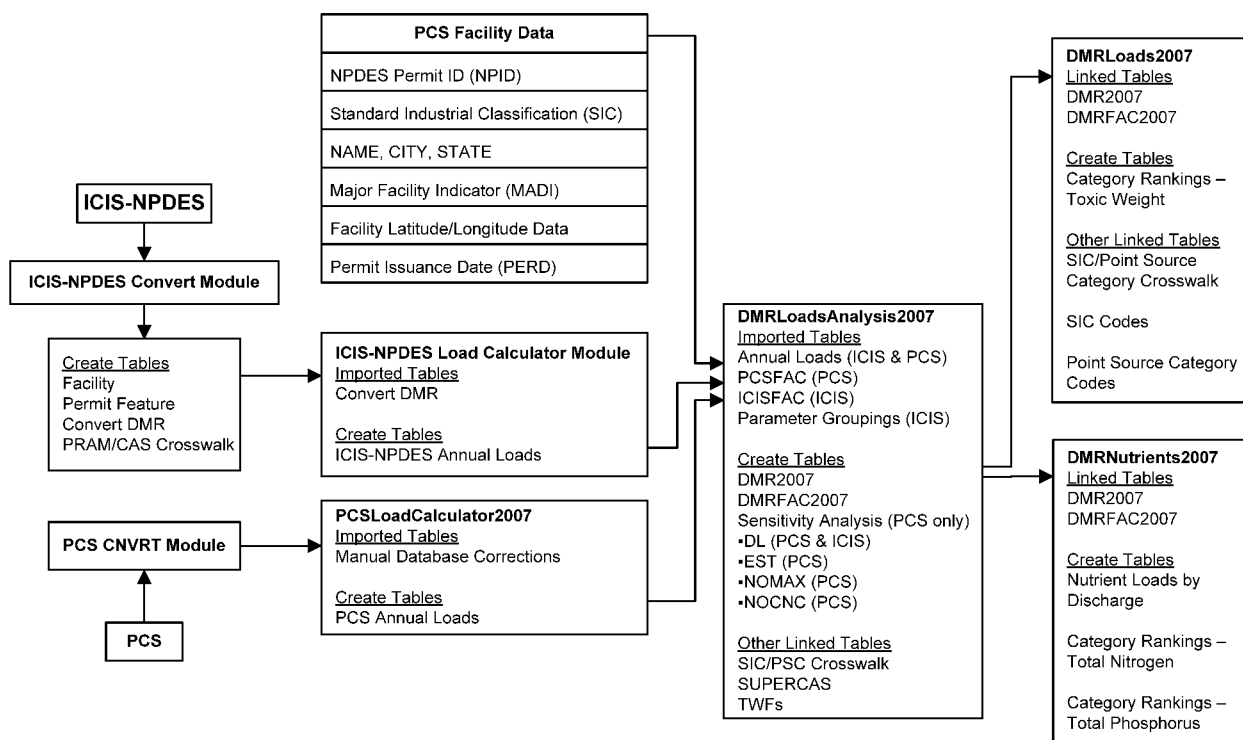


Figure 3-1. Relationship Between Data Sources and Database Development Tools for the Development of DMRLoads2007

EPA used the following data sources and database development tools to create DMRLoads2007:

- PCS:** This mainframe database is the source of the pollutant discharge data and facility information used in the development of *PCSLoadCalculator2007*. EPA used year 2007 data from PCS to develop *PCSLoadCalculator2007*.
- ICIS-NPDES:** This web-based Oracle™ database is the source of the pollutant discharge data and facility information used in the development of the ICIS-NPDES Pollutant Loading Tool. EPA used year 2007 data from ICIS-NPDES to develop the ICIS-NPDES Pollutant Loading Tool. EPA obtained ICIS-NPDES data directly from OECA, as it is not yet available through a public download system.
- EPA's Convert Programs:** Two EPA programs convert pollutant concentrations and loads in DMR data into standard units and match them with flows and permit limits. The PCS convert program (CNVRT) is a mainframe computer program developed and maintained by OECA. The ICIS-NPDES Convert Module is a ColdFusion™ based program developed by EPA for the 2009 and future annual reviews that extracts DMR data from ICIS-NPDES and stores the converted data to an Oracle™ database.

- **EPA’s Load Calculator Routines:** EPA developed its PCS and ICIS-NPDES Load Calculator Routines based on OECA’s Effluent Data Statistics (EDS) System for PCS:
 - The PCS Load Calculator Routine uses a series of Microsoft Access™ database queries in *PCSLoadCalculator2007* to compute annual pollutant loads. In addition, *PCSLoadCalculator2007* tracks database corrections for monthly flow, quantity, concentration, reporting frequency, and internal monitoring locations.
 - The ICIS-NPDES Load Calculator Routine uses the ICIS-NPDES Load Calculator Module, a ColdFusion™-based program that extracts converted DMR data from the ICIS-NPDES Pollutant Loading Tool Oracle™ database and calculates annual pollutant loads. The ICIS-NPDES Load Calculator Module differs from *PCSLoadCalculator2007* in that it is part of a dynamic web application that allows users to selectively query loads and specify calculation assumptions.

Both load calculator routines produce five alternative loads by applying variations in calculations assumptions (see Sections 3.2.2.2 and 3.2.3.2).

- ***DMRLoadsAnalysis2007:*** This PC-based Microsoft Access™ database standardizes and then combines the annual loads data from *PCSLoadCalculator2007* and the ICIS-NPDES Loading Tool. The database also examines the impact of the alternative load calculations (see Section 3.2.4.2 for additional details). The database uses the calculation assumptions that EPA selected based on the results of the data sensitivity analyses conducted for the 2007 annual review, and creates the DMR2007 table, which provides one annual load per pollutant discharge. Additionally, this database calculates the toxic-weighted pound equivalent (TWPE) for each pollutant discharge. This database applies several database corrections, based on findings during previous annual reviews and the 2009 annual review quality review (see Section 3.4), to correct errors related to facility categorization, pollutant discharge categorization, parameter groupings, intermittent discharges, and internal monitoring locations. See Section 3.2.4 for additional details on *DMRLoadsAnalysis2007*.
- ***DMRNutrients2007:*** This PC-based Microsoft Access™ database uses the annual loads for nitrogen and phosphorus compounds from the DMR2007 table to calculate aggregate “nitrogen as N” and “phosphorus as P” loads for each facility outfall. The database sums the aggregate nitrogen and phosphorus loads by facility and by point source category and exports the aggregated loads to *DMRLoads2007*.

3.2.2 *PCSLoadCalculator2007*

EPA developed *PCSLoadCalculator2007* to process CNVRT output into a structure usable to calculate annual loads. *PCSLoadCalculator2007* is a Microsoft Access™ database that implements EPA’s PCS Load Calculator routine. As depicted in Figure 3-1, *PCSLoadCalculator2007* uses CNVRT output and calculates annual loads for each pollutant and discharge point using PCS Load Calculator. The output from *PCSLoadCalculator2007* is the

“PCS Annual Loads” table, which is exported to *DMRLoadsAnalysis2007* for combination with ICIS-NPDES Pollutant Loading Tool annual loads for further calculations and analyses.

The PCS Load Calculator routine is based on OECA’s mainframe computer program, called the EDS system. This system establishes how to calculate annual loads from the CNVRT output and was used in the 2003 and 2005 annual reviews (U.S. EPA, 1997). In 2005, EPA developed the PCS Load Calculator to duplicate the EDS system and to address data processing difficulties when using EDS (U.S. EPA, 2005). EPA continues to use the PCS Load Calculator routine instead of the EDS system because it allows EPA flexibility and control over the annual load calculations and provides transparent documentation of the calculations.

3.2.2.1 CNVRT Module Input for *PCSLoadCalculator2007*

EPA used CNVRT module output to create *PCSLoadCalculator2007* (see Figure 3-1). From the PCS mainframe, the CNVRT module performs units conversions, matches flow rates with pollutant measurements, assigns a statistical basis of measurement, and performs formatting changes to convert the PCS data into a format that is usable for annual load calculations. Table 3-3 presents the CNVRT module output that EPA used as a starting point for its annual load calculations for *PCSLoadCalculator2007*.

Table 3-3. PCS CNVRT Module Output

PCS Field	Description
NPID	NPDES Number
SIC2	Standard Industrial Classification Code
DSCH	Discharge Pipe
DRID	Report Designator
NRPU	Number of Units in Reporting Period
PRAM	Parameter Code
MLOC	Monitoring Location
SEAN	Season Number
MODN	Modification Number
LIPQ	Limit Pipe Set Qualifier
STAT	Statistical Base Code
MVDT	Measurement/Violation Monitoring Period End Date
MVIO	Measurement/Violation Code
NODI	No Data Indicator
LMQAV	Measurement/Violation Quantity Average BDL Indicator
LMQMX	Measurement/Violation Quantity Maximum BDL Indicator
LMCMN	Measurement/Violation Concentration Minimum BDL Indicator
LMCAV	Measurement/Violation Concentration Average BDL Indicator
LMCMX	Measurement/Violation Concentration Maximum BDL Indicator
MQAV	Measurement/Violation Quantity Average
MQMX	Measurement/Violation Quantity Maximum
MCMN	Measurement/Violation Concentration Minimum
MCAV	Measurement/Violation Concentration Average

Table 3-3. PCS CNVRT Module Output

PCS Field	Description
MCMX	Measurement/Violation Concentration Maximum
FMQAV	Measurement/Violation Quantity Average Flow
FMQMX	Measurement/Violation Quantity Maximum Flow
FMCMN	Measurement/Violation Concentration Minimum Flow
FMCAV	Measurement/Violation Concentration Average Flow
FMCMX	Measurement/Violation Concentration Maximum Flow

The following describes the functions of the CNVRT module:

- Unit Conversions:** The CNVRT module converts the PCS measurement data into standard units of kg/day for mass quantities, mg/L for concentrations, and million gallons per day (MGD) for flow rates.
- Matching Flows with Pollutant Discharges:** Quantities and concentrations are reported to PCS using five pollutant parameter measurement fields (MQAV, MQMX, MCMN, MCAV, MCMX (see Table 3-3 for measurement field descriptions). Wastewater flow rates are reported to PCS as a pollutant parameter using the same five measurement value fields. CNVRT matches wastewater flow rates with pollutant measurements using identifying fields in PCS, such as monitoring period end date, monitoring location, discharge pipe number, report designator, and season number. CNVRT creates five new columns for each pollutant discharge record and stores the matching flow information in these fields (FMQAV, FMQMX, FMCMN, FMCAV, and FMCMX).
- Assigning Statistical Basis:** The statistical basis of measurements in PCS is identified by the statistical base code. CNVRT categorizes the 150 statistical base codes in PCS as representing average, maximum, minimum, or total measured values. CNVRT then simplifies the statistical base code by assigning a number from 0 to 4 to each measurement value field. The assigned numbers are as follows:
 - 0 – No Value Reported,
 - 1 – Average,
 - 2 – Total Monitoring Period Value,
 - 3 – Maximum, and
 - 4 – Minimum.

CNVRT combines the numbers assigned to each of the five measurement values into one five-digit code called STAT5. Each of the five digits in STAT5 corresponds to one of the five measurement fields for pollutant loads or concentrations. Figure 3-2 shows an example of a possible STAT5 code. In this figure, the measurements reported for MQAV, and MCAV are based on average values, MQMX and MCMX are based on maximum values, and MCMN is based on the minimum value.

- Formatting Changes:** For pollutants measured at concentrations below their detection limit (BDL), facilities report the detection limit concentration to PCS and indicate that the measurement is BDL using a less-than sign (<). CNVRT pulls the less-than signs from the measurement value fields and places them in a separate field.

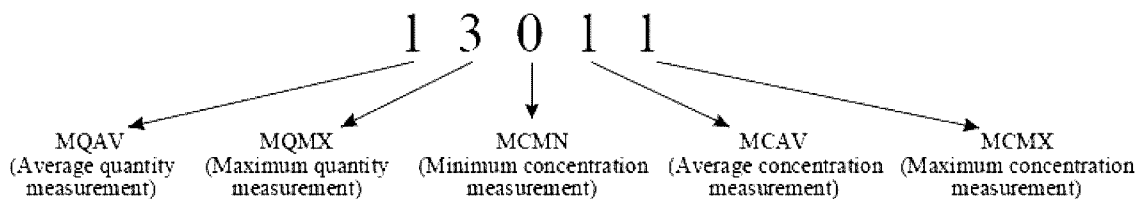


Figure 3-2. Example PCS STAT5 Code

3.2.2.2 PCS Annual Load Calculation Routine

This section describes the calculations used to produce annual loads from CNVRT output files in *PCSLoadCalculator2007*. Figure 3-3 presents a flow diagram for the *PCSLoadCalculator2007* routine. Files obtained from the CNVRT module are the starting point for the PCS Load Calculator routine.

PCS Data Selection

Some monitoring data in the CNVRT output are not relevant to calculating effluent loads, and the PCS Load Calculator selects relevant CNVRT output. Irrelevant information includes pollutant discharges for internal monitoring locations, pollutant discharges reported for certain measurement fields, and flows reported for certain measurement fields. For example, for a certain monitoring location, pollutant discharges may be reported as both a mass quantity and a concentration. However, EPA does not use concentration data if the quantity is also reported. The PCS Load Calculator routine selects relevant PCS data for the following parameters: 1) monitoring location, 2) measurement value, and 3) flow value, as described below.

Monitoring Location Selection. Permits often require a facility to monitor at multiple locations. The monitoring location is indicated in PCS in the MLOC field. Two of the many PCS MLOC codes designate effluent discharges:

- MLOC 1 - Effluent gross discharge; and
- MLOC 2 - Effluent net discharge.

For its screening level review, EPA estimates annual loads that represent effluent discharges. Therefore, the PCS Load Calculator searches the monitoring field location (MLOC) in PCS to find effluent data only (MLOC 1 or MLOC 2). When both types of effluent data are present for an outfall, MLOC 2 is used in preference to MLOC 1.

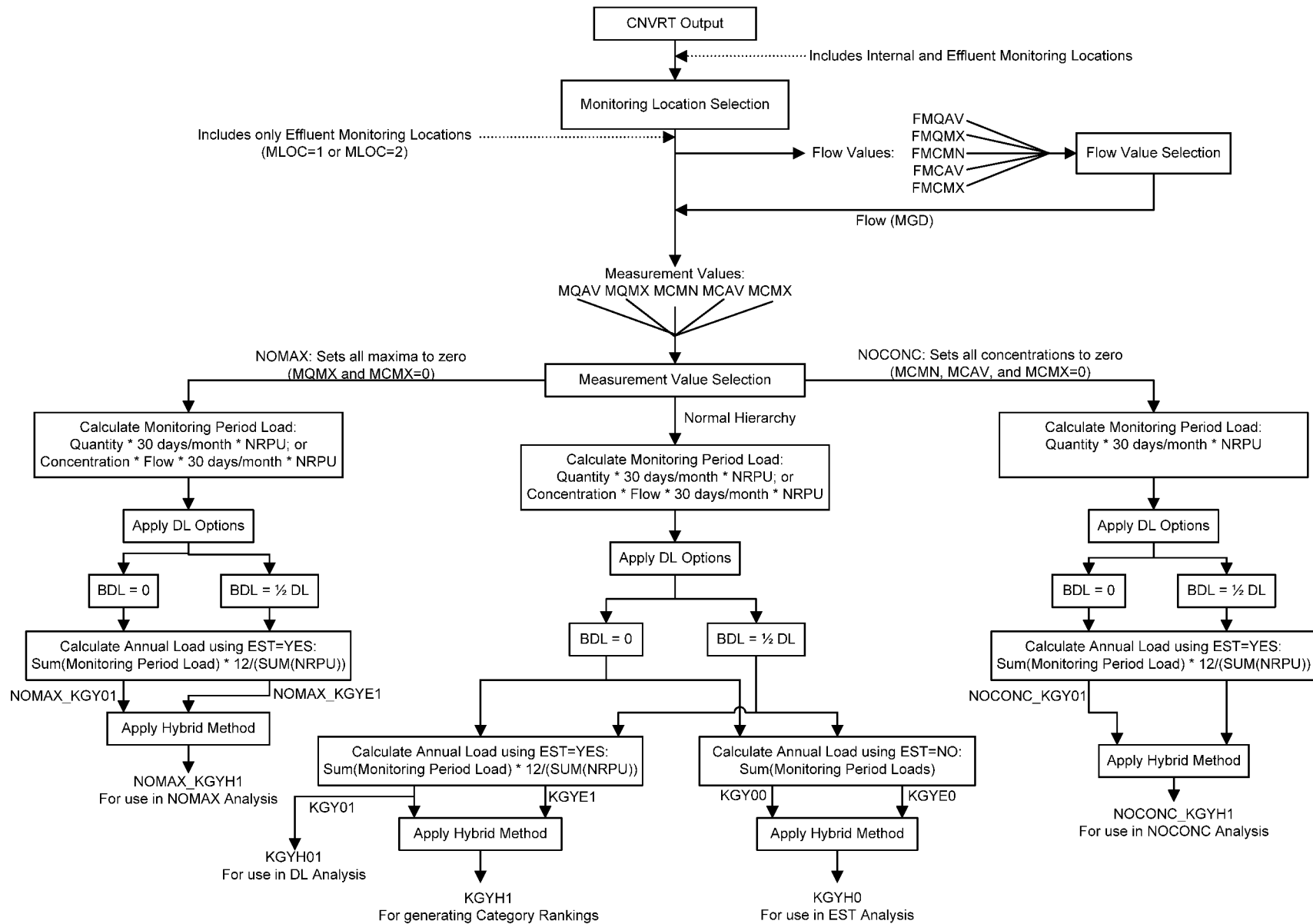


Figure 3-3. Flow Diagram for PCS Load Calculator Routine

Measurement Value Selection. PCS contains five measurement value fields for measured pollutant data (MQAV, MQMX, MCMN, MCAV, and MCMX). The PCS Load Calculator uses a two-step process to select which of these measurement values to use to calculate the annual loads. In the first step, the PCS Load Calculator attempts to identify an average value using STAT5 and a measurement field hierarchy. (See Section 3.2.2.1 for how CNVRT develops STAT5 number using statistical base codes in PCS data.) The PCS Load Calculator first searches each STAT digit corresponding to the PCS measurement fields in the following sequence, or hierarchy:

- Average Load (MQAV);
- Maximum Load (MQMX);
- Average Concentration (MCAV);
- Maximum Concentration (MCMX); or
- Minimum Concentration (MCMN).

A measurement must meet two criteria to be selected for loads calculation: 1) the mass quantity or concentration must be nonzero, and 2) the corresponding STAT digit for the measurement value field must equal 1.

If the PCS Load Calculator cannot identify a measurement that meets these two criteria, then the PCS Load Calculator selects measurement values based on which field they populate without considering the STAT5 digit. In this step, the following hierarchy is used:

- The average load (MQAV) field is used if it contains a non-zero value;
- If MQAV cannot be used, and a flow rate is reported, the concentration fields are searched in the following order and the first nonzero concentration is multiplied by the flow to calculate the load:
 - Average Concentration (MCAV);
 - Maximum Concentration (MCMX);
 - Minimum Concentration (MCMN); and
- If flow and concentration cannot be used to calculate the load, the maximum load (MQMX) is used.

For sensitivity analyses, EPA calculated two sets of alternative loads (“NOMAX” and “NOCONC”) using variations on the measurement value selection hierarchy. Figure 3-3 shows how these alternative loads relate to the loads calculated using the normal hierarchy. Section 3.2.4.2 describes the purpose of the alternative calculations and EPA’s analysis of NOMAX and NOCONC annual loads.

Flow Value Selection. To select the appropriate flow data to use to calculate annual loads, the PCS Load Calculator uses a hierarchy that is similar to the measurement value selection hierarchy. The PCS Load Calculator searches the flow measurement fields in the following sequence and selects the first non-zero value it finds:

- Average Quantity Flow (FMQAV);
- Average Concentration Flow (FMCAV)⁹;
- Maximum Concentration Flow (FMCMX);
- Minimum Concentration Flow (FMCMN); and
- Maximum Quantity Flow (FMQMX).

While conducting the flow selection process, the PCS Load Calculator attempts to identify and correct flows that have misreported units, which is a common problem for flows in PCS. The PCS Load Calculator attempts to correct this problem by assuming that any reported flow rate greater than 5,000 MGD is actually gallons per day (GPD), and divides the reported flow by one million. For flows ranging from 1,300 to 5,000 MGD, EPA compares units for flow permit limits to verify the units reported in PCS and makes corrections on a case-by-case basis¹⁰. This is a change from the EDS methodology, which divides all flows that are greater than 1,300 MGD by one million. Section 3.2.2.3 discusses EPA's basis for this change in methodology.

Calculate Monitoring Period Load

After completing the monitoring location, measurement value, and flow selection hierarchies, the PCS Load Calculator has identified one mass quantity or one concentration and flow to calculate a load for each pollutant discharge for each monitoring period. The duration of discharge that each monitoring period represents depends on the reporting frequency required by a facility's NPDES permit. For example, if a facility is required to report monthly, then the reported discharge for the monitoring period will represent one month of discharges (assuming continuous discharges). If a facility is required to report quarterly, then the reported discharge for the monitoring period will represent three months of discharges. EPA assumes that an outfall discharges continuously for 30 days per month, and the PCS Load Calculator calculates the monthly load using one of the following equations:

- Calculation of monthly load from daily load (MQAV or MQMX):

$$\text{Monthly Load (kg/mo)} = \text{Daily Load (kg/day)} \times 30 \text{ (days/mo)}$$

- Calculation of monthly load from concentration and flow (MCAV, MCMX, or MCMN):

$$\text{Monthly Load (kg/mo)} = \text{Conc. (mg/L)} \times \text{Flow (MGD)} \times 3.785 \text{ (L/gal)} \times 30 \text{ (days/mo)}$$

As Figure 3-3 shows, the PCS Load Calculator then adjusts the monthly load to represent quarterly, semiannual, or annual loads where appropriate by multiplying each monthly load by the number of reporting units (NRPU). The NRPU data element is a numeric code that indicates whether a pollutant is monitored monthly (NRPU = 1), quarterly (NRPU = 3), semiannually (NRPU = 6), or annually (NRPU = 12). For example, if a facility reported a 30-day average load

⁹ A "concentration flow" is a flow measurement that was reported to a concentration measurement field. Facilities may report flows in any of the five measurement value fields. However, all flows are reported in units of MGD whether they are reported in a quantity field or a concentration field.

¹⁰ EPA determined that all flows between 1,300 and 5,000 MGD reported by facilities in Ohio were flows in GPD. EPA automatically divided these flows by 1,000,000. However, because power plants are known to have high flows, EPA made flow corrections to Ohio facilities reporting SIC code 4911 (Electrical Services) on a case-by-case basis.

of 25 kg/day for its required quarterly report (NRPU=3), the PCS Load Calculator calculates the load for the quarter as $25 \text{ kg/day} \times 30 \text{ days/month} \times 3 \text{ month/quarter} = 2,250 \text{ kg/quarter}$.

Apply DL Options

As shown in Figure 3-3, the PCS Load Calculator produces two monitoring period loads by using different calculation assumptions for pollutants that were measured BDL. Using the BDL indicator field from the CNVRT output, the PCS Load Calculator identifies pollutants that were measured BDL. If the BDL indicator field contains a less-than sign (<), the PCS Load Calculator calculates two period loads: one by setting the monitoring period load to zero (BDL = 0) and a second by dividing the monitoring period load in half (BDL = $\frac{1}{2}$ DL). If the BDL indicator field is blank, then the PCS Load Calculator uses the calculated period load for both options. Table 3-4 shows an example calculation of loads for the two DL options.

Table 3-4. Example Calculation for DL Option Loads

Calculated Monitoring Period Load (kg/period)	BDL Indicator Field	Option BDL = 0 Load (kg/period)	Option BDL = $\frac{1}{2}$ DL Load (kg/period)
100	Blank	100	100
100	<	0	50

Calculate Annual Load Scenarios

The output from the monitoring period load calculation step should include the following data for each pollutant discharge:

- Twelve loads for monthly reports;
- Four loads for quarterly reports;
- Two loads for semiannual reports; and
- One load for annual reports.

However, in some cases, PCS does not contain a complete set of discharges for the year. If a facility does not report a pollutant concentration or mass quantity on its DMR, then the facility uses the no data indicator (NODI) field to explain why no discharge is reported. NODI is a single character code in PCS, which corresponds to a no data indicator description. Table 3-5 presents descriptions of all the NODI codes.

Table 3-5. NODI Code Descriptions

NODI Code	NODI Description
1	Wrong flow
2	Operations shutdown
4	Discharge to lagoon/groundwater
5	Frozen conditions
7	No influent
8	Other
9	Conditional monitoring

Table 3-5. NODI Code Descriptions

NODI Code	NODI Description
A	General permit exemption
B	Below detection limit/no detection
C	No discharge occurred for the monitoring period
D	Lost sample
E	Analysis not conducted
F	Insufficient flow for sampling
G	Sampling equipment failure
H	Invalid test
I	Land applied
J	Recycled – water-closed system
K	Flood disaster
L	DMR received but not entered
Q	Not quantifiable
R	Administratively resolved
S	Fire conditions
V	Weather related
W	Dry lysimeter/well
X	Parameter/value not reported

The PCS Load Calculator includes two options for calculating the annual load when PCS does not contain a complete set of monitoring period loads for the year: 1) sum the existing monitoring period loads to calculate the annual load (EST=NO); or 2) estimate loads for the missing monitoring periods (EST=YES). The following sections describes the calculation of EST=YES and EST=NO loads. For the 2009 annual review, EPA used only the EST=YES loads.

Calculate EST=YES Annual Loads. The PCS Load Calculator uses the sum of NRPU values to identify annual loads that do not include a complete set of monitoring period loads. First, the PCS Load Calculator sums the NRPU values for the monitoring periods that have calculated pollutant loads. In addition, the PCS Load Calculator sums the NRPU values for blank records with NODI codes that indicate no discharge occurred for the monitoring period. As part of the 2009 annual review, EPA reviewed all NODI codes and determined that the following NODI codes represent “no discharge” events:

- 2: Operations Shutdown;
- 4: Discharge to Lagoon/Groundwater;
- 7: No Influent;
- 9: Conditional Monitoring;
- C: No Discharge;
- I: Land Applied;
- J: Recycled – Water-Closed System; and
- W: Dry Lysimeter/Well.

Note that EPA updated the list of NODI codes for the 2009 annual review. For previous annual reviews, EPA used a different list of “no discharge” NODI codes. See Section 3.2.2.3 for additional information.

The PCS Load Calculator then combines the sum of NRPU values for monitoring period loads and monitoring periods with no discharge. If all monitoring periods for the annual data set either have discharge data or indicate no discharge, then the sum of NRPU will equal 12. For example, if a facility is required to monitor quarterly, the NRPU assigned to each quarterly report is 3. If four quarterly reports are present, the total NRPU is 12 (3+3+3+3), indicating all required reports are present. However, if the annual data set includes blanks for any of the monitoring periods and does not indicate that no discharge occurred for the monitoring period, then the sum of NRPU will be less than 12.

As shown in Figure 3-3, the input to the *Calculate EST=YES Annual Loads* step includes two sets of monitoring period loads from the *Calculate DL Options* step: BDL = 0 and BDL = ½ DL. To calculate the EST=YES load, the PCS Load Calculator sums monitoring period loads for the DL = 0 option and separately sums the monitoring period loads for the DL = ½ DL option. For each sum, the PCS Load Calculator then extrapolates the calculated annual load to account for blank records using the following equation:

$$(\text{EST}=\text{YES}) \text{ Annual Load (kg/yr)} = \text{Sum}(\text{Monitoring Period Load} \times \text{NRPU}) \times (12/\text{Sum}(\text{NRPU}))$$

Calculate EST=NO annual loads. During the EST=YES calculation step, the PCS Load Calculator also calculates an alternative annual load using the EST=NO option. The calculation for EST=NO is the same as the EST=YES calculation except EST=NO does not multiply the sum of the period loads by the ratio of 12 and the sum of NRPU values. The EST=NO annual load is shown in the following equation:

$$(\text{EST} = \text{NO}) \text{ AnnualLoad (kg/yr)} = \sum (\text{MonitoringPeriodLoad} \times \text{NRPU})$$

Apply Hybrid Method

As shown in Figure 3-3, the output from the *Calculate EST=YES Annual Loads* step includes two annual loads for the DL options: BDL = 0 and BDL = ½ DL. During this calculation step, the PCS Load Calculator applies the following logic to select which calculated load to use to represent the final annual load:

- If the BDL = 0 load equals zero, use the BDL = 0 load (all monitoring period loads for 2007 are zero); and
- If the BDL = 0 load is greater than zero, use the BDL = ½ DL load (at least one monitoring period was not zero, i.e., the pollutant was detected at least once during 2007).

As shown in Figure 3-3, the PCS Load Calculator calculates alternative annual loads starting at the *Measurement Value Selection* step. During this step, the PCS Load Calculator calculated two sets of alternative monitoring period loads using variations on the measurement value selection hierarchy: 1) set all maximum concentrations and loads to zero (NOMAX); and 2) set all average, maximum, and minimum concentrations to zero (NOCONC). The PCS Load Calculator

then applied the DL options to these alternative loads and calculated EST=YES and EST=NO annual loads for the NOMAX and NOCONC alternatives. As a final step the PCS Load Calculator applies the Hybrid Method to the calculated alternative loads. See Section 3.2.4.2 for discussion of the alternative annual loads.

***PCSLoadCalculator2007* Output**

The PCS Load Calculator produces 12 calculated annual loads for each pollutant discharge. Table 3-6 lists the 12 calculated annual loads and describes the purpose of each load. Seven of the loads use various assumptions for pollutant measurements reported as BDL, which are used to calculate final loads using the Hybrid Method. Five of the loads are final loads, which are used for category rankings and sensitivity analyses (see Section 3.2.4.2). The five final annual loads are included in the *PCSLoadCalculator2007* output to *DMRLoadsAnalysis2007*.

Table 3-6. *PCSLoadCalculator2007* Output

Annual Load	EST Option	DL Option	Measurement Selection Hierarchy	Purpose
<i>Interim Loads</i>				
KGYE1	Yes	BDL = ½ DL	Normal	Used with KGY01 to calculate Hybrid (KGYH1)
KGY00	No	BDL = 0	Normal	Used with KGYE0 to calculate Hybrid (KGYH0)
KGYE0	No	BDL = ½ DL	Normal	Used with KGY00 to calculate Hybrid (KGYH0)
NOMAX_KGY01	Yes	BDL = 0	All maxima set to zero	Used with NOMAX_KGYE1 to calculate Hybrid (NOMAX_KGYH1)
NOMAX_KGYE1	Yes	BDL = ½ DL	All maxima set to zero	Used with NOMAX_KGY01 to calculate Hybrid (NOMAX_KGYH1)
NOCONC_KGY01	Yes	BDL = 0	All concentrations set to zero	Used with NOCONC_KGYE1 to calculate Hybrid (NOCONC_KGYH1)
NOCONC_KGYE1	Yes	BDL = ½ DL	All concentrations set to zero	Used with NOCONC_KGY01 to calculate Hybrid (NOCONC_KGYH1)
<i>Final Loads</i>				
KGYH1	Yes	Hybrid	Normal	Category Rankings
KGYH0	No	Hybrid	Normal	EST Analysis
KGY01	Yes	BDL = 0	Normal	DL Analysis
NOMAX_KGYH1	Yes	Hybrid	All maxima set to zero	No Max Analysis
NOCONC_KGYH1	Yes	Hybrid	All concentrations set to zero	No Conc Analysis

3.2.2.3 Changes to EDS Methodology

As stated previously, EPA followed the EDS methodology to develop the annual load calculation methodology for *PCSLoadCalculator2007*. This section discusses changes that EPA made to the methodology including the reason for the change.

NRPU Correction. Monitoring frequencies may vary for certain pollutants or outfalls depending on a facility's permit requirements. Discharges may be reported monthly, quarterly, semiannually, or annually. As discussed previously, the NRPU data element is a numeric code that indicates whether a pollutant is monitored monthly (NRPU = 1), quarterly (NRPU = 3), semiannually (NRPU = 6), or annually (NRPU = 12). As described in Section 3.2.2.2, the PCS Load Calculator uses the NRPU value for two steps in the annual load calculation.

- The first step that uses the NRPU value is the monitoring period load calculation. During this step, the PCS Load Calculator calculates a monthly load by multiplying a mass quantity by 30 days per month, and then multiplies the monthly load by the NRPU value to calculate a quarterly, semi-annual, or annual load.
- The second step that uses the NRPU value is the calculation of annual loads using the EST=YES option. During this step, the PCS Load Calculator uses the sum of the NRPU values associated with the reported discharges to determine if all DMR data for the pollutant are present in PCS. If the sum of the NRPU values equals 12, then all required discharge data are present for that reporting year.

During the development of *PCSLoadCalculator2007*, EPA observed that the sum of NRPU values for several annual loads was greater than 12, indicating that discharge data for more than the required number of DMRs were present in PCS. Following are two scenarios that resulted in the sum of NRPU exceeding 12.

- **Scenario 1: Incorrect NRPU reported.** The first scenario is a data-entry error where the NRPU in PCS was incorrect for the frequency of the reported discharges. For example, a quarterly discharge report should have an NRPU value of 3, but the NRPU value in PCS was 6. As a result, the monthly load for each quarter was multiplied by 6 instead of 3 during the quarterly load calculation, which double-counted the quarterly loads. The EST=YES calculation automatically corrects this error by multiplying the annual load by the ratio of 12 to the sum of the NRPU values. For this example, the sum of NRPU values for the four quarterly reports would be 24 instead of 12. Therefore, using EST=YES, the annual load would be multiplied by 12/24 (0.5), which eliminates the double-counting. For EST=NO, however, this error results in double-counting the annual load since the EST=NO calculation does not multiply the annual load by the ratio of 12 to the sum of NRPU values. EPA corrected the NRPU values for the Scenario 1 cases by changing the NRPU values in the monthly data to correctly reflect the monitoring frequency.
- **Scenario 2: Multiple monthly measurements.** The second scenario occurred if a facility reported discharges twice in one month. For example, a facility reports a discharge monthly to PCS (NRPU = 1), but reported two discharges for September (one on September 15 and one on September 30). The NRPU values for both September reports are 1. Similar to Scenario 1, the double-counting that results from this error is corrected during the EST=YES calculation but not during the EST=NO calculation. In addition to double-counting, this error also causes the discharges reported for September to account for a disproportionate amount of the annual load. For example, the monthly load calculation multiplies both the

September 15th and September 30th loads by 30. As a result, September discharges account for 2 out of 13 months instead of 1 out of 12 months. EPA corrected the NRPU values for the Scenario 2 cases by dividing the NRPU values for months with multiple discharges by the number of discharges reported for the month. For this example, the September NRPU value of 1 was divided by 2 because there were two discharge reports for September (corrected NRPU = 0.5). As a result, the monthly load calculation multiplies each September discharge by 30 days per month and 0.5, making each discharge account for one half of a month (15 days).

NODI Codes Excluded from EST=YES Assumption. As stated in Section 3.2.2.2, EPA updated the list of NODI codes that indicate that no discharge occurred. Prior to the 2009 Annual Review, EPA used the NODI codes shown below:

- C: No discharge;
- D: Lost sample;
- E: Analysis not conducted;
- F: Insufficient flow for sampling;
- G: Sampling equipment failure;
- H: Invalid test;
- K: Flood disaster;
- 5: Frozen conditions; and
- 8: Other.

EPA revised this list to the following using information obtained from OECA during the 2009 annual review:

- 2: Operations shutdown;
- 4: Discharge to Lagoon/Groundwater;
- 7: No Influent;
- 9: Conditional Monitoring;
- C: No discharge;
- I: Land Applied;
- J: Recycled – Water-Closed System; and
- W: Dry Lysimeter/Well.

EPA assumed that the above NODI codes represent “no discharge” for the 2009 annual review and will continue to use them for subsequent reviews.

EPA evaluated the effect of revising the NODI codes used in the EST=YES calculation on the category rankings by comparing two sets of annual loads calculated using *PCSLoadCalculator2007*:

1. Annual loads calculated using the NODI codes for previous annual reviews (C, D, E, F, G, H, K, 5, and 8); and
2. Annual loads calculated using the revised NODI codes for the 2009 annual review (2, 4, 7, 9, C, I, J, and W).

Table 3-7 presents a summary of the results of the NODI analysis for the 10 point source categories showing the highest absolute increase in TWPE from the NODI changes and the total for PCS-portion of *DMRLoads2007*. As shown in Table 3-7, revising the NODI codes changed the total TWPE for the PCS-portion of *DMRLoads2007* by only 0.086 percent (794,000 lb-eq). The categories showing the greatest sensitivity to the NODI revisions include Copper Forming (40 CFR Part 468); Justice, Public Order, and Safety (SIC Group 92), and Grain Mills (40 CFR Part 406) Categories. Table B-3 in Appendix B presents the pounds and TWPE using the two NODI code options by pollutant parameters. Pollutant parameters showing the highest sensitivity to the NODI revisions include mercury, 2,3,7,8-Tetrachlorodibenzo-p-dioxin, and polychlorinated biphenyls.

Flow Correction. As described in Section 3.2.2.2, the PCS Load Calculator attempts to identify and correct flows that have misreported units using a two-step process. First, the PCS Load Calculator assumes that any flow rate that is greater than 5,000 MGD should actually be reported as GPD, and divides the flow by one million. EPA also reviews reported flows ranging from 1,300 to 5,000 MGD by comparing reporting units to permit limits to verify the reporting units and makes corrections on a case-by-case basis. This is a change from the EDS methodology, which divides all flows that are greater than 1,300 MGD by one million.

The 1,300 MGD cutoff was based on the maximum flow rate identified at the time that EDS was developed. EPA has identified several facilities that currently discharge wastewater at flows exceeding 1,300 MGD. The 1,300 MGD cutoff used by EDS would underestimate loads for these facilities by a factor of one million if the facilities report pollutant discharges as concentrations in PCS. During the development of *PCSLoadCalculator2004* as part of the 2007 annual review, EPA queried the Envirofacts Data Warehouse¹¹ Web page for design flows. The design flow rate is the average flow, in MGD, that a facility is designed to accommodate. The highest design flow identified by this query was 4,453 MGD for the DC Water and Sewer Authority (DC0000221). EPA based the new 5,000 MGD cutoff on this design flow. To be consistent with the methodology used in the 2007 annual review, EPA used this cutoff again for the 2009 annual review.

NODI B. The following is a discussion of a methodology change that EPA considered, but decided not to implement. NODI (no data indicator) is a single character code that indicates why pollutant measurements are blank for a reporting period. NODI = B means that the pollutant was measured BDL for that monitoring period. Typically, facilities report BDL measurements by reporting the detection limit concentration (or a mass quantity that was calculated using the detection limit concentration) and indicate the measurement is BDL using a less-than (<) sign. However, some facilities report BDL measurements by leaving the measurement value field blank and reporting B in the NODI field. Because the detection limit concentration is not provided in PCS, EPA cannot calculate period loads when the NODI B reporting method is used.

¹¹ Envirofacts is a web-based system that allows the public to access PCS data for recent years.

Table 3-7. Results of NODI Code Excluded from EST=YES Revision Analysis for PCS

Point Source Category	PCS Annual Load, lb/yr ^a	PCS Annual Load with NODI Revisions, lb/yr ^b	Difference in PCS Annual Load, lb/yr	PCS TWPE, lb-eq/yr ^a	PCS TWPE with NODI Revisions, lb-eq/yr ^b	Difference in PCS TWPE, lb-eq/yr
Copper Forming (40 CFR Part 468)	2,110,000	2,300,000	191,000 (9.1%)	77.9	1,080	1,000 (1,290%)
Justice, Public Order, and Safety (SIC Group 92)	1,230,000	1,270,000	39,300 (3.2%)	49.5	214	164 (332%)
Grain Mills (40 CFR Part 406)	21,400,000	27,500,000	6,130,000 (29%)	437	1,600	1,160 (265%)
Nonferrous Metals Manufacturing (40 CFR Part 421)	152,000,000	139,000,000	13,000,000 (8.5%)	262,000	529,000	267,000 (102%)
Canned and Preserved Seafood Processing (40 CFR Part 408)	9,900,000	13,100,000	3,200,000 (32%)	3,120	5,670	2,540 (82%)
Meat and Poultry Products (40 CFR Part 432)	53,800,000	80,700,000	26,900,000 (50%)	445,000	152,000	292,000 (66%)
Metal Molding and Casting (Foundries) (40 CFR Part 464)	5,860,000	5,340,000	517,000 (8.8%)	4,940	6,040	1,100 (22%)
Aluminum Forming (40 CFR Part 467)	13,900,000	14,100,000	150,000 (1.1%)	11,900	13,600	1,740 (15%)
Tobacco Products (PNC)	10,700	9,990	755 (7%)	2.95	2.53	0.422 (14%)
Mineral Mining and Processing (40 CFR Part 436)	265,000,000	271,000,000	6,200,000 (2.3%)	26,700	29,400	2,710 (10%)
Total DMRLoads2007	35,800,000,000	39,700,000,000	3,860,000,000	918,000,000	918,000,000	794,000

Source: DMRLoads2007_v3.

^a The Total Annual Load and Total TWPE include the revised NODI codes for the EST=YES assumption and were used in generating the category rankings.^b The Total Annual Load and Total TWPE with NODI Revisions include the pre-2009 NODI codes for the EST=YES assumption.

PNC – Potential new category.

If the pollutant is measured BDL for all 12 months of the year, then the outcome using NODI B is the same as the Hybrid Method – the total annual load is zero. However, if the pollutant is detected at least once during 2007, the EST=YES option will estimate loads for the months when the pollutant was reported as NODI B based on the detected value. For example, if a pollutant is reported as NODI B for 11 months but is measured at a concentration above its detection limit for one month, then the effect of the EST=YES option would be to multiply the detected concentration by 12 to account for the months when the facility reported NODI B. This is an overestimation of the Hybrid Method, which would use a concentration equal to half the detection limit for months when the pollutant was measured BDL.

EPA considered three options for correcting the overestimation of loads for NODI B:

- Option 1: Make no change.
- Option 2: Exclude NODI B from the EST=YES estimation option. The EST function currently excludes a list of NODI characters that indicate that no discharge occurred for the monitoring period. Adding NODI B to the list would result in setting all BDL measurements that use the NODI B reporting method to zero, which is an underestimation of the Hybrid Method.
- Option 3: Use a concentration of one-half the method detection limit (MDL) for BDL measurements if the pollutant was detected at least once for 2007. This option most closely resembles the Hybrid Method, but it would require EPA to identify MDLs for all pollutant parameters with NODI B values. Based on 2007 data, NODI B was reported for more than 250 parameters.

EPA conducted an analysis to determine the impact of using the EST function for NODI B on the category rankings. EPA ran the PCS Load Calculator and generated category rankings first using EST=YES for NODI B and then using EST=NO for NODI B. EPA's analysis found that estimating for NODI B using EST=YES accounts for 708,000 lb-eq (0.08 percent) of the TWPE from facilities in *PCSLoadCalculator2007*. The top 12 categories generated using EST=YES for NODI B and using EST=NO for NODI B are identical. Therefore, EPA concluded that, because using EST=YES for NODI B did not have a significant impact on the screening-level analysis, no correction was necessary for the NODI B estimation. As a result, EPA did not make any changes to the EST=YES calculation methodology for NODI B.

NODI Q. Similar to the NODI B analysis discussed above, EPA evaluated the potential effects of including NODI Q in the EST=YES assumption on the category rankings. NODI Q means that the measurement was not quantifiable. A measurement is not quantifiable if the concentration was above the detection limit but the laboratory has determined that the value cannot be accurately determined. As in the NODI B discussion above, EPA considered three options for correcting the overestimation due to NODI Q:

- Option 1: Make no change.
- Option 2: Exclude NODI Q from the EST=YES estimation option. The EST function currently excludes a list of NODI characters that indicate that no discharge occurred for the monitoring period. Adding NODI Q to the list would result in setting all BDL measurements that use the NODI Q reporting method to zero, which is an underestimation of the Hybrid Method.

- Option 3: Use a concentration of one-half the method detection limit (MDL) for BDL measurements if the pollutant was detected at least once for 2007. This option most closely resembles the Hybrid Method, but it requires EPA to identify MDLs for over 300 pollutant parameters.

For the same reasons described in the NODI B section above, EPA does not have the detection limits for NODI Q records and cannot apply the EST=YES assumption using the Hybrid Method for outfalls in which a pollutant is detected at least once during the year. Because the number of records reporting NODI Q in PCS was small (0.02 percent of the total), EPA determined that there should be no change to EDS methodology.

3.2.3 ICIS-NPDES Pollutant Loading Tool

The ICIS-NPDES Pollutant Loading Tool is a web-based application consisting of a user interface, business logic layer, and an Oracle™ database. The purpose of the pollutant loading tool is to calculate annual loads, similar to PCS CNVRT and *PCSLoadCalculators*, but for ICIS-NPDES data instead of PCS data. The ICIS-NPDES Pollutant Loading Tool contains two calculation modules:

- A Convert Module that extracts ICIS-NPDES DMR data, processes and formats the data for loads calculations, and stores the converted data in an Oracle™ database; and
- A Load Calculator Module that queries the Oracle™ database and calculates annual pollutant loads.

To allow for consistency between the calculated PCS and ICIS-NPDES loads, the Convert Module mimics the functions of the PCS CNVRT Module while the ICIS-NPDES Load Calculator Module mimics the methodology EPA developed for the PCS Load Calculator routine that is used in *PCSLoadCalculator2007*.

3.2.3.1 ICIS-NPDES Convert Module Development and Verification

The ICIS-NPDES Convert Module extracts data from ICIS-NPDES tables, stores the extracted data into five denormalized tables, converts DMR measurements into standardized units of measure, identifies the statistical basis of the permit limits, and matches DMR measurements with wastewater flows and permit limits. The following describes the functions of the ICIS-NPDES Convert Module.

Step 1: Extract Data and Create Denormalized Tables: The Convert Module downloads and stores the ICIS-NPDES data from 19 extracted tables into the following five interim tables: DMR, FACILITY, LIMITS, PERMIT FEATURE, and PRAM_CAS CROSSWALK. Additionally, the Convert Module also creates three lookup tables to perform the Convert Module functions:

- The UNIT_CONVERSIONS table provides conversion factors for unit codes to convert concentrations into units of mg/L, loads into kg/day, and flows into MGD;

- The STAT5 table assigns approximately 160 statistical base codes from the LIMITS table in ICIS to one of four categories: 1 = Average; 2 = Total; 3 = Maximum; and 4 = Minimum; and
- The FLOW_PRAM_CODES table identifies 24 parameter codes for wastewater flow and assigns priorities that the Convert Module uses to match one flow per outfall and monitoring period for load calculations.

Step 2: Convert to Standard Units: DMR data and permit limits are stored in ICIS-NPDES in the measurement units specified by facilities' NPDES permits. The ICIS-NPDES database then converts the DMR measurements and limits into standard units. The Convert Module verifies the ICIS standard units conversion in the following steps:

- Identify Units of Measure – Unit codes are provided in the DMR and LIMITS tables. However, the unit code field in the DMR table is blank for most records. Therefore, the Convert Module selects unit codes from the LIMITS tables if the DMR unit code fields are blank.
- Verify ICIS Unit Conversions – In this step, the Convert Module back-calculates the ICIS conversion factors by dividing the standard units values by the original values. EPA then compared the ICIS conversion factors to conversion factors that EPA specified in the UNIT_CONVERSIONS look-up table (Table B-4 in Appendix B). EPA corrected the ICIS-NPDES conversions that did not match the look-up table. The Convert Module corrected approximately 0.3 percent of the DMR records in ICIS-NPDES.

Step 3: Assign Statistical Base Codes: ICIS data contain approximately 160 statistical base codes to describe the statistical basis of the DMR measurements (e.g., 30-day geometric mean or rolling average). These codes are stored in the LIMITS table. The Convert Module uses the STAT5 look-up table (Table B-5 in Appendix B) to assign each statistical base code to one of five categories:

- 0 = Statistical Base Code is Null;
- 1 = Average;
- 2 = Total;
- 3 = Maximum; and
- 4 = Minimum.

Although specific information regarding the statistical basis of the measurement is lost during this step, the simplification is necessary for efficient calculation of loads. The Convert Module creates a STAT5 code (see Figure 3-2 for an example STAT5 code) consisting of five characters. Each character of the STAT5 code corresponds to one measurement value field.

Step 4: Select Flows: The Convert Module selects DMR measurements for parameters that are identified as wastewater flows in the FLOW_PRAM_CODES look-up table, and matches flows with pollutant measurements. EPA identified 24 flows that are appropriate for loads calculations¹². EPA assigned priorities to the PRAM codes in the FLOW_PRAM_CODES

¹² ICIS-NPDES contains other flow parameters such as recirculation flow, flow into well, and flows reported as percentages or number of occurrences. EPA determined that these flows were not appropriate to use in calculating mass discharges to receiving streams.

look-up table (Table B-6 in Appendix B). If a facility reports more than one type of flow PRAM for the same outfall, then the Convert Module selects the PRAM code with the highest priority in the look-up table. As a result, the Convert Module selects only one flow for each outfall, monitoring location, and monitoring period end date.

Step 5: Select Temperature and pH: The Convert Module creates two new columns in the CONVERT_DMR table for wastewater stream temperature and pH. ICIS-NPDES contains two parameter codes for temperature and one parameter code for pH:

- Temperature Degrees C = PRAM 00010;
- Temperature Degrees F = PRAM 00011; and
- pH = PRAM 00400.

The Convert Module uses a measurement value selection hierarchy, based on the STAT5 codes created in Step 4, to select one pH and one temperature for each permitted feature, monitoring location, and monitoring period end date.

Step 6: Identify Number of Report: The Convert Module identifies the number of days per monitoring period using the NMBR_OF_REPORT field and the MONITORING_PERIOD_END_DATE field. The NMBR_OF_REPORT field indicates the number of months of discharges represented on each DMR. For example, a NMBR_OF_REPORT of 1 indicates a monthly report and a NMBR_OF_REPORT of 3 is a quarterly report (i.e., three months are in a quarter). EPA reviewed the ICIS-NPDES data and identified the following valid NMBR_OF_REPORT values:

- 1 = Monthly Report;
- 2 = Bi-monthly Report;
- 3 = Quarterly Report;
- 4 = Triannual Report (typically for April, August, and December);
- 6 = Semi-annual Report; and
- 12 = Annual Report.

However, due to a data-entry rule in ICIS, some DMR records have invalid NMBR_OF_REPORT values, such as 5, 7, 8, 9, 10, 11 or greater than 12. Because ICIS does not allow users to enter a monitoring period start date that is earlier than the permit effective date, facilities whose permits are renewed part-way through the year cannot enter valid NMBR_OF_REPORT values. For example, if a facility submitted a semi-annual DMR in June, which covered discharges from January to June, but their NPDES permit was renewed in February, then ICIS will not allow the facility to enter a monitoring period start date earlier than the effective date of the permit (February). As a result the NMBR_OF_REPORT field in ICIS is 5 instead of 6. The Convert Module addresses this issue by rounding up invalid NMBR_OF_REPORT values to the next valid value. In addition, NMBR_OF_REPORT values that are greater than 12 are converted to 12.

Once all NMBR_OF_REPORT have been converted to valid values, the Convert Module uses Table 3-8 to assign the actual number of days for the monitoring period. This table presents the actual number of days for all possible MONITORING_PERIOD_END_DATE and NMBR_OF_REPORT combinations.

Table 3-8. Actual Number of Days per Monitoring Period

Monitoring Period End Date Month	Number of Report					
	1	2	3	4	6	12
January	31	62	92	123	184	365
February ^a	28	59	90	120	181	365
March	31	59	90	121	182	365
April	30	61	89	120	181	365
May	31	61	92	120	182	365
June	30	61	91	122	181	365
July	31	61	92	122	181	365
August	31	62	92	123	184	365
September	30	61	92	122	183	365
October	31	61	92	123	184	365
November	30	61	91	122	183	365
December	31	61	92	122	184	365

^a Does not account for the number of days in February during leap years.

As a final step for assigning the number of days per monitoring period, the Convert Module identifies and corrects monitoring periods with multiple reported measurements. For example, if a facility's NPDES permit requires them to report wastewater selenium discharges on both January 15 and January 30, the Loading Tool would overestimate the annual selenium load because it would multiply both the January 15 and January 31 discharges by 31 days per month according to Table 3-8. To eliminate this overestimation, the Convert Module divides the NMBR_OF_REPORT and the NMBR_OF_DAYS by the number of DMRs submitted per monitoring period. Using the above example, the Convert Module calculates the NMBR_OF_REPORT and NMBR_OF_DAYS for the January DMRs as follows:

$$\text{NMBR_OF_REPORT} = \frac{\text{NMBR_OF_REPORT (1)}}{2 \text{ Reports per month}} = 0.5$$

$$\text{NMBR_OF_DAYS} = \frac{\text{NMBR_OF_DAYS (31)}}{2 \text{ Reports per month}} = 15.5$$

Step 7: Correct Flows: The Convert Module corrects flows. The methodology corrects all flows exceeding 5,000 MGD, and applies more conservative criteria to correct flows from 1,000 to 5,000 MGD. The Convert Module uses three types of erroneous flow indicators to correct flows:

1. Type 1: Month-to-Month Variability: In this step, the Convert Module compares flows reported for each month and identifies variations greater than three orders of magnitude using the following procedure:

- a. Create a field that identifies the magnitude of each flow (e.g., 62,800 MGD has a magnitude of 10,000);
- b. Group flow magnitudes by LIMIT_ID¹³;
- c. Find the minimum flow magnitude that is $\geq 1,000$;
- d. Find the maximum flow magnitude that is $< 1,000$;
- e. Calculate a flow correction factor by dividing Step C/Step D;
- f. If the correction factor indicates a difference of three orders of magnitude or more, and the actual measured flow is 1,000 to 5,000 MGD, then correct the flow as follows:

$$\text{Corrected Flow (MGD)} = \text{Actual Measured Flow (MGD)} \times \left(\frac{\text{Maximum Flow Magnitude} < 1,000}{\text{Minimum Flow Magnitude} \geq 1,000} \right)$$

- g. If the correction factor indicates a difference of one order of magnitude or more, and the actual measured flow is $\geq 5,000$ MGD, then correct the flow using the equation in step f).

Table 3-9 presents an example of a Type 1 flow correction that the Convert Module identified. As shown in the table, the September 2007 flow is three orders of magnitude higher than the flows reported for other monitoring periods. Therefore, the Convert Module divided the September flow by 1,000.

Table 3-9. Example Type 1 Flow Correction

External Permit Number	Permitted Feature Number	Monitoring Period End Date	Original Flow	Flow Magnitude	New Flow	Correction Applied?
GA0037648	0B0	31-Mar-07	0.74	0.1	0.74	No
GA0037648	0B0	30-Apr-07	0.54	0.1	0.54	No
GA0037648	0B0	31-May-07	0.67	0.1	0.67	No
GA0037648	0B0	30-Jun-07	1.31	1	1.31	No
GA0037648	0B0	31-Jul-07	1.02	1	1.02	No
GA0037648	0B0	31-Aug-07	1.06	1	1.06	No
GA0037648	0B0	30-Sep-07	2,554.00	1000	2.55	Yes
GA0037648	0B0	31-Oct-07	1.24	1	1.24	No
GA0037648	0B0	31-Dec-07	1.29	1	1.29	No
GA0037648	0B0	28-Feb-07	0.96	0.1	0.96	No
GA0037648	0B0	31-Jan-07	1.02	1	1.02	No
GA0037648	0B0	30-Nov-07	0.85	0.1	0.85	No
Maximum Flow Magnitude $< 1,000$				1		
Minimum Flow Magnitude $\geq 1,000$				1000		
Correction Factor				1000		

¹³ The LIMIT_ID is a unique identifier in the ICIS_LIMITS table. It is a primary key for each unique set of parameter code, limit set, season, and permitted feature.

2. Type 2: Variations from Design Flows and Actual Average Flows in FACILITIES: The FACILITIES table contains information for facility design flow and actual average flow in MGD. These fields are not required and therefore are not populated for all records. However, when populated, these fields can be used to help evaluate the reasonableness of the flows reported in the DMR data. The Convert Module compares the design flow and actual average flow in FACILITIES to the reported flows in CONVERT_DMR using the following procedure:
- Use ACTUAL_AVG_FLOW if reported. If ACTUAL_AVG_FLOW is not reported, then use DESIGN_FLOW.
 - Use similar procedure as Type 1 to calculate the magnitude of the reported flows and the actual/design flow magnitudes.
 - Divide the reported flow (e.g., FQ1) magnitude by the actual/design flow magnitude to calculate the correction factor.
 - If the correction factor indicates a difference of three orders of magnitude or more, and the actual measured flow is 1,000 to 5,000 MGD, then correct the flow as follows:

$$\text{Corrected Flow (MGD)} = \text{Actual Measured Flow (MGD)} \times \left(\frac{\text{Design Flow Magnitude}}{\text{Actual Measured Flow Magnitude}} \right)$$

- If the correction factor indicates a difference of one order of magnitude or more, and the actual measured flow is $\geq 5,000$ MGD, then correct the flow using the equation in step d.

Table 3-10 presents an example of a Type 2 flow correction that the Convert Module identified. As shown in the table, the reported flows (FQ1) were six orders of magnitude higher than the facility design flow. Therefore, the Convert Module divided all flows by 1,000,000.

Table 3-10. Example Type 2 Flow Correction

External Permit Number	Permitted Feature Number	Monitoring Period End Date	Original Flow	Flow Magnitude	Design Flow	Design Flow Magnitude	Correction Factor	New Flow
NH0100692	001	31-Jan-07	250,038	100,000	0.5	0.1	1,000,000	0.25
NH0100692	001	28-Feb-07	131,243	100,000	0.5	0.1	1,000,000	0.13
NH0100692	001	31-Mar-07	203,087	100,000	0.5	0.1	1,000,000	0.20
NH0100692	001	30-Apr-07	308,359	100,000	0.5	0.1	1,000,000	0.31
NH0100692	001	31-May-07	382,444	100,000	0.5	0.1	1,000,000	0.38
NH0100692	001	30-Jun-07	460,524	100,000	0.5	0.1	1,000,000	0.46
NH0100692	001	31-Jul-07	308,488	100,000	0.5	0.1	1,000,000	0.31
NH0100692	001	31-Aug-07	154,491	100,000	0.5	0.1	1,000,000	0.15
NH0100692	001	30-Sep-07	161,996	100,000	0.5	0.1	1,000,000	0.16
NH0100692	001	31-Oct-07	158,444	100,000	0.5	0.1	1,000,000	0.16

Table 3-10. Example Type 2 Flow Correction

External Permit Number	Permitted Feature Number	Monitoring Period End Date	Original Flow	Flow Magnitude	Design Flow	Design Flow Magnitude	Correction Factor	New Flow
NH0100692	001	30-Nov-07	183,168	100,000	0.5	0.1	1,000,000	0.18
NH0100692	001	31-Dec-07	190,775	100,000	0.5	0.1	1,000,000	0.19

3. Type 3: Flows Exceeding the 5,000 MGD Cap: If a reported flow exceeds 5,000 MGD and is not identified for the Type 1 or Type 2 corrections, then the Convert Module assumes that the flow was incorrectly entered in units of GPD and divides the flow by 1,000,000.

Step 8: Select Effluent Monitoring Location: Permits often require a facility to monitor at multiple locations. The monitoring location is indicated in the CONVERT_DMR table in the MONITORING_LOCATION_CODE (MLOC) field. Five monitoring location codes in ICIS-NPDES represent effluent discharges, seen below. For its screening level review, EPA estimates annual loads that represent effluent discharges. Like *PCSLoadCalculator2007*, the ICIS-NPDES Load Calculator searches the monitoring location field to identify effluent data only. When more than one type of effluent data are present for an outfall, MLOC is selected in the following hierarchy:

- MLOC 2 - Effluent gross discharge;
- MLOC 1 - Effluent net discharge;
- MLOC A - After disinfection;
- MLOC B - Before disinfection; and
- MLOC SC - See comments.

For example, if a facility reports both MLOC 1 and MLOC 2, MLOC 2 is used in preference to MLOC 1.

In executing the above steps, the Convert Module creates the following four output tables:

- CONVERT_DMR;
- FACILITY;
- PERMIT FEATURE; and
- PRAM_CAS_CROSSWALK.

Figure 3-4 shows the relationship diagram for the Convert Module Output.

The CONVERT_DMR table contains year 2007 DMR measurements for over 10,000 permits, of which approximately 80 percent are individual NPDES permits, 15 percent are general permits, and the remaining five percent include industrial user permits and state-issued non-NPDES permits.

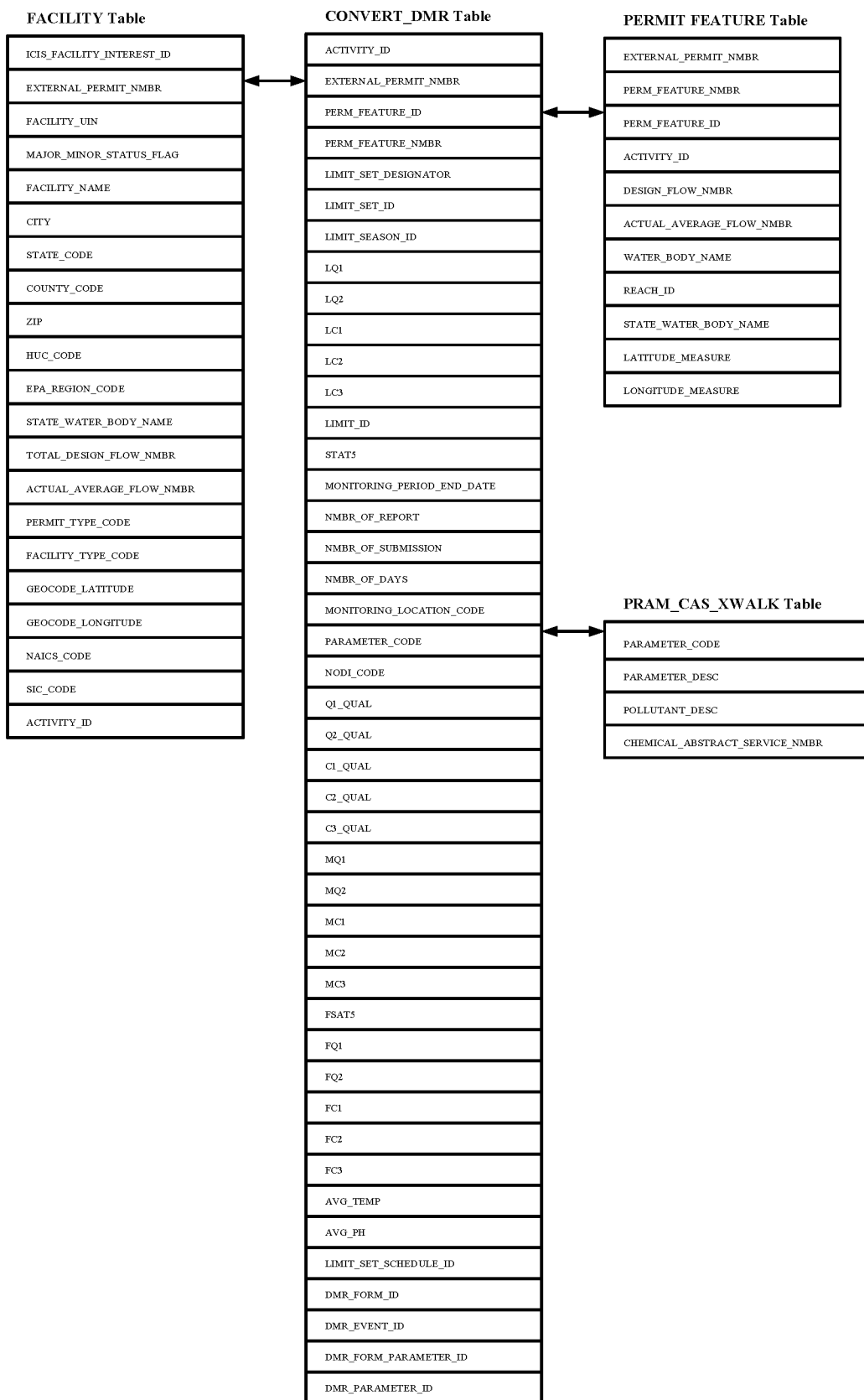


Figure 3-4. Relationship Diagram for Convert Module Output

3.2.3.2 ICIS-NPDES Load Calculator Module Annual Load Calculation

This section describes the calculation steps used by the ICIS-NPDES Load Calculator Module to produce annual loads from the ICIS-NPDES Convert Module output tables. As stated in Section 3.2.3, the ICIS-NPDES Load Calculator was developed to mimic the methodology EPA developed for the PCS Load Calculator routine (see Section 3.2.2.2). EPA developed the ICIS-NPDES Pollutant Loading Tool as a user-guided, web-based module that includes functions beyond calculating category rankings for the annual review.

The following is a description of the steps taken by the ICIS-NPDES Load Calculator for selecting monitoring location, flows, and measurement values and calculating annual loads.

Step 1: Measurement Value Selection. The CONVERT_DMR table (depicted in Figure 3-4) stores DMR data extracted from ICIS-NPDES in five measurement value fields. These include:

- Quantity 1 (MQ1);
- Quantity 2 (MQ2);
- Concentration 1 (MC1);
- Concentration 2 (MC2); and
- Concentration 3 (MC3).

These measurement value fields correspond to the five DMR fields where quantity and concentration data are stored: 1) Average Quantity (Quantity 1 or 2); 2) Maximum Quantity (Quantity 1 or 2); 3) Minimum Concentration (Concentration 1, 2, or 3); 4) Average Concentration (Concentration 1, 2, or 3); and 5) Maximum Concentration (Concentration 1, 2, or 3). Note that unlike PCS, the measurement value fields in ICIS-NPDES are not specific to average, maximum, or minimum. The statistical basis of the measurements in ICIS-NPDES is determined by the five-digit statistical base code associated with each measurement field.

Facilities may use a variety of measurements to populate the five measurement value fields. For example, a facility can use a monthly average, daily average, 30-day geometric average, etc. to represent the average quantity. The CONVERT_DMR table contains a five-digit statistical base code (STAT5). The following codes are used for the types of measurements that may be reported:

- Average (STAT5=1);
- Total (STAT5=2);
- Maximum (STAT5=3);
- Minimum (STAT5=4); and
- Null (STAT5=0).

Each of the five digits in the STAT5 field corresponds to one of the five measurement value fields. Figure 3-5 shows an example of a possible STAT5 code. In this figure, the measurements reported for MQ1, MC2, and MC3 are average values, MQ2 is a maximum value, and no value was reported for MC1. The ICIS-NPDES STAT5 example shown in Figure 3-5 is the same as that shown for PCS in Figure 3-2 except that it was updated to show how the STAT5 digits correspond to ICIS-NPDES measurement value fields.

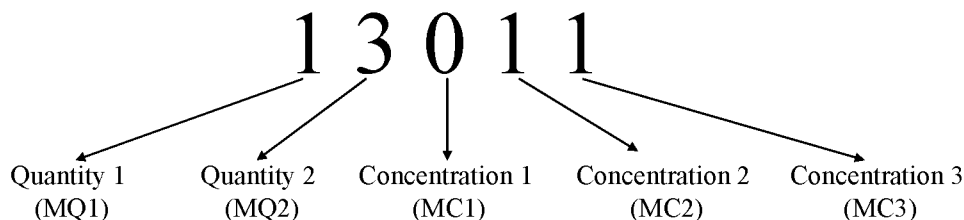


Figure 3-5. Example STAT5 Code in ICIS-NPDES CONVERT_DMR Table

The ICIS-NPDES Load Calculator selects measurements for loads calculations using a hierarchy that prioritizes average values and quantities. In the first step, the ICIS-NPDES Load Calculator attempts to identify an average value (STAT=1) by searching the STAT5 digits from left to right. By scanning left to right, the ICIS-NPDES Load Calculator searches the STAT5 digits that correspond to measurement fields in the following sequence:

- Quantity 1 (MQ1);
- Quantity 2 (MQ2);
- Concentration 1 (MC1);
- Concentration 2 (MC2); and
- Concentration 3 (MC3).

If the ICIS-NPDES Load Calculator finds an average value (STAT5=1), then it selects the corresponding measurement for load calculation and performs the following calculations:

- If the selected measurement is a quantity (MQ1 or MQ2):
 - Average daily load (kg/day) = MQ
 - Average concentration (mg/L) = MQ/(Flow (MGD) × 3.785 (L/gal))
 - Monitoring Period Load (kg/monitoring period) = MQ × NMBR_OF_DAYS
 - Monitoring Period Load Over Limit (LOL) = (MQ – LQ (Quantity Limit)) × NMBR_OF_DAYS
- If the selected measurement is a concentration (MC1, MC2, or MC3):
 - Average daily load (kg/day) = MC × Flow × 3.785
 - Average concentration (mg/L) = MC
 - Monitoring Period Load (kg/monitoring period) = MC × Flow (MGD) × 3.785 (L/gal) × NMBR_OF_DAYS
 - Monitoring Period LOL = (MC – LC (Concentration Limit)) × Flow × 3.785 × NMBR_OF_DAYS

If the ICIS-NPDES Load Calculator does not find an average value (STAT=1), then it scans STAT5 from left to right for a total value (STAT=2). “Total” values apply only to quantity measurements, and because these measurements represent the total mass discharge for the monitoring period, the ICIS-NPDES Load Calculator cannot use the same calculations used for average, maximum, and minimum values. If the ICIS-NPDES Load Calculator identifies a total value, it selects the value and performs the following calculations:

- Average Daily Load (kg/day) = $MQ / NMBR_OF_DAYS$
- Average Concentration (mg/L) = $MQ / (Flow \times NMBR_OF_DAYS \times 3.785)$
- Monitoring Period Load (kg/monitoring period) = MQ
- Monitoring Period LOL = $MQ - LQ$

If the ICIS-NPDES Load Calculator does not find an average value (STAT=1) or a total value (STAT=2), then it scans STAT5 from left to right for a maximum value (STAT=3). If the Load Calculator identifies a maximum value, then it selects that value and performs the same calculations used for the average values (STAT=1).

If the ICIS-NPDES Load Calculator does not find an average value (STAT=1), total value (STAT=2), or maximum value (STAT=3), then it scans STAT5 from left to right for a minimum value (STAT=4). If the ICIS-NPDES Load Calculator identifies a minimum value, then it selects that value and performs the same calculations used for the average values (STAT=1).

Finally, if all measurement value fields are blank, then the ICIS-NPDES Load Calculator sets the average daily load, average concentration, monitoring period load, and load-over-limit fields to null.

Table 3-11 presents the measurement value selection priorities and calculations.

Step 2: Flow Value Selection. The ICIS-NPDES Load Calculator uses a similar hierarchy for selecting flow rates and the FSTAT5 code. The FSTAT5 code applies the same concept as the STAT5 code, and provides information about the statistical basis of wastewater flow values. Similar to the measurement value selection hierarchy, the flow selection hierarchy prioritizes average flows.

First, the ICIS-NPDES Load Calculator attempts to find an average flow (FSTAT=1) by scanning the FSTAT5 code from left to right. By scanning from left to right, the ICIS-NPDES Load Calculator searches the FSTAT5 digits corresponding to the flow values in the following sequence:

- Flow Quantity 1 (FQ1);
- Flow Quantity 2 (FQ2);
- Flow Concentration 1 (FC1)¹⁴;
- Flow Concentration 2 (FC2); and
- Flow Concentration 3 (FC3).

If the ICIS-NPDES Load Calculator finds an average value (STAT5=1), then it selects the corresponding flow for load calculation and performs the following calculations:

- Average Daily Flow (MGD) = $Flow$
- Monitoring Period Flow (MG/monitoring period) = $Flow \times NMBR_OF_DAYS$

¹⁴ A “flow concentration” is a flow measurement that was reported to a concentration measurement field. Facilities may report flows in any of the five measurement value fields. However, all flows are reported in units of MGD whether they are reported in a quantity field or a concentration field.

Table 3-11. Measurement Value Selection Priorities and Calculations

Priority	Value Type	STAT Code	Average Daily Load (KGD)	Average Concentration (MP_MGL)	Monitoring Period DMR Load (KGMP)	MP_LOL
1	MQ1	1	MQ1	$MQ1 / (Flow \times 3.785)$	$MQ1 \times NMBR_OF_DAYS$	$(MQ1 - LQ1) \times NMBR_OF_DAYS$
2	MQ2	1	MQ2	$MQ2 / (Flow \times 3.785)$	$MQ2 \times NMBR_OF_DAYS$	$(MQ2 - LQ2) \times NMBR_OF_DAYS$
3	MC1	1	$MC1 \times Flow \times 3.785$	MC1	$MC1 \times Flow \times 3.785 \times NMBR_OF_DAYS$	$(MC1 - LC1) \times Flow \times 3.785 \times NMBR_OF_DAYS$
4	MC2	1	$MC2 \times Flow \times 3.785$	MC2	$MC2 \times Flow \times 3.785 \times NMBR_OF_DAYS$	$(MC2 - LC2) \times Flow \times 3.785 \times NMBR_OF_DAYS$
5	MC3	1	$MC3 \times Flow \times 3.785$	MC3	$MC3 \times Flow \times 3.785 \times NMBR_OF_DAYS$	$(MC3 - LC3) \times Flow \times 3.785 \times NMBR_OF_DAYS$
6	MQ1	2	$MQ1 / NMBR_OF_DAYS$	$MQ1 / (MP_MGD \times 3.785)$	MQ1	MQ1 – LQ1
7	MQ2	2	$MQ2 / NMBR_OF_DAYS$	$MQ2 / (MP_MGD \times 3.785)$	MQ2	MQ2 – LQ2
8	MQ1	3	MQ1	$MQ1 / (Flow \times 3.785)$	$MQ1 \times NMBR_OF_DAYS$	$(MQ1 - LQ1) \times NMBR_OF_DAYS$
9	MQ2	3	MQ2	$MQ2 / (Flow \times 3.785)$	$MQ2 \times NMBR_OF_DAYS$	$(MQ2 - LQ2) \times NMBR_OF_DAYS$
10	MC1	3	$MC1 \times Flow \times 3.785$	MC1	$MC1 \times Flow \times 3.785 \times NMBR_OF_DAYS$	$(MC1 - LC1) \times Flow \times 3.785 \times NMBR_OF_DAYS$
11	MC2	3	$MC2 \times Flow \times 3.785$	MC2	$MC2 \times Flow \times 3.785 \times NMBR_OF_DAYS$	$(MC2 - LC2) \times Flow \times 3.785 \times NMBR_OF_DAYS$
12	MC3	3	$MC3 \times Flow \times 3.785$	MC3	$MC3 \times Flow \times 3.785 \times NMBR_OF_DAYS$	$(MC3 - LC3) \times Flow \times 3.785 \times NMBR_OF_DAYS$
13	MQ1	4	MQ1	$MQ1 / (Flow \times 3.785)$	$MQ1 \times NMBR_OF_DAYS$	$(MQ1 - LQ1) \times NMBR_OF_DAYS$
14	MQ2	4	MQ2	$MQ2 / (Flow \times 3.785)$	$MQ2 \times NMBR_OF_DAYS$	$(MQ2 - LQ2) \times NMBR_OF_DAYS$
15	MC1	4	$MC1 \times Flow \times 3.785$	MC1	$MC1 \times Flow \times 3.785 \times NMBR_OF_DAYS$	$(MC1 - LC1) \times Flow \times 3.785 \times NMBR_OF_DAYS$
16	MC2	4	$MC2 \times Flow \times 3.785$	MC2	$MC2 \times Flow \times 3.785 \times NMBR_OF_DAYS$	$(MC2 - LC2) \times Flow \times 3.785 \times NMBR_OF_DAYS$

Table 3-11. Measurement Value Selection Priorities and Calculations

Priority	Value Type	STAT Code	Average Daily Load (KGD)	Average Concentration (MP_MGL)	Monitoring Period DMR Load (KGMP)	MP_LOL
17	MC3	4	$MC3 \times \text{Flow} \times 3.785$	MC3	$MC3 \times \text{Flow} \times 3.785 \times \text{NMBR_OF_DAYS}$	$(MC3 - LC3) \times \text{Flow} \times 3.785 \times \text{NMBR_OF_DAYS}$
18	No Data (NODI is not null)	Any	NULL	NULL	NULL	NULL

If the ICIS-NPDES Load Calculator does not find an average flow (FSTAT=1), then it scans FSTAT5 from left to right for a total flow (FSTAT=2). Because “total” flows represent the total wastewater discharge for the monitoring period, the ICIS-NPDES Load Calculator cannot use the same calculations used for average, maximum, and minimum flows. If the ICIS-NPDES Load Calculator identifies a total flow, it selects the value and performs the following calculations:

- Average Daily Flow (MGD) = Flow/MNBR_OF_DAYS
- Monitoring Period Flow (MG/monitoring period) = Flow

If the ICIS-NPDES Load Calculator does not find an average flow (FSTAT=1) or a total flow (FSTAT=2), then it scans FSTAT5 from left to right for a maximum flow (FSTAT=3). If the Load Calculator identifies a maximum flow, then it selects that flow and performs the same calculations used for the average flows (FSTAT=1).

If the ICIS-NPDES Load Calculator does not find an average flow (FSTAT=1), total flow (FSTAT=2), or maximum value (FSTAT=3), then it scans FSTAT5 from left to right for a minimum flow (FSTAT=4). If the ICIS-NPDES Load Calculator identifies a minimum flow, then it selects that flow and performs the same calculations used for the average flows (FSTAT=1).

Table 3-12 presents the flow value selection priorities and calculations.

Table 3-12. Flow Value Selection Priorities

Priority	Value Type	FSTAT5	Average Daily Flow (MGD)	Monitoring Period Flow (MGMP)
1	Quantity 1	1	FQ1	FQ1 * NMBR_OF_DAYS
2	Quantity 2	1	FQ2	FQ2 * NMBR_OF_DAYS
3	Conc 1	1	FC1	FC1 * NMBR_OF_DAYS
4	Conc 2	1	FC2	FC2 * NMBR_OF_DAYS
5	Conc 3	1	FC3	FC3 * NMBR_OF_DAYS
6	Quantity 1	2	FQ1 / NMBR_OF_DAYS	FQ1
7	Quantity 2	2	FQ2 / NMBR_OF_DAYS	FQ2
8	Quantity 1	3	FQ1	FQ1 * NMBR_OF_DAYS
9	Quantity 2	3	FQ2	FQ2 * NMBR_OF_DAYS
10	Conc 1	3	FC1	FC1 * NMBR_OF_DAYS
11	Conc 2	3	FC2	FC2 * NMBR_OF_DAYS
12	Conc 3	3	FC3	FC3 * NMBR_OF_DAYS
13	Quantity 1	4	FQ1	FQ1 * NMBR_OF_DAYS
14	Quantity 2	4	FQ2	FQ2 * NMBR_OF_DAYS
15	Conc 1	4	FC1	FC1 * NMBR_OF_DAYS
16	Conc 2	4	FC2	FC2 * NMBR_OF_DAYS
17	Conc 3	4	FC3	FC3 * NMBR_OF_DAYS

Step 3: Detection Limit Options (DL). When pollutants are not detected, their concentrations are presumed to be below their detection limit (BDL). Permittees may report the detection limit with a less-than sign (<) to indicate that the pollutant was BDL. The CONVERT_DMR table stores the less-than signs for nondetects in the data qualifier field that corresponds to the measurement value (i.e., MQ1_Qual, MQ2_Qual, MC1_Qual, MC2_Qual, or MC3_Qual). If a pollutant is BDL, the pollutant concentration may be between zero and the detection limit. The ICIS-NPDES Load Calculator calculates three versions of each monitoring period load and concentration using each of the following assumptions:

- BDL equals zero;
- BDL equals the detection limit; or
- BDL equals one-half the detection limit.

Step 4: Calculate Load-Over-Limit. The ICIS-NPDES Load Calculator performs some calculations that are not performed on PCS data, but may be used as part of EPA's screening-level review. The Load-Over-Limit (LOL) compares the monitoring period loads to the NPDES permit limits on a mass basis. LOL is not used in rankings categories but may be used in future reviews. LOL is calculated using the following steps:

- Select the limits from the limit value fields that correspond to the selected measurement value fields;
- Calculate a monitoring period load over limit using one of the following equations:
 - Calculation of monitoring period LOL from mass quantity (MQ1 or MQ2):

$$\text{Monitoring Period LOL (kg/period)} = [(\text{MQ (kg/day)} - \text{LQ (kg/day)}) \times \text{NMBR_OF_DAYS}]$$

- Calculation of monitoring period LOL from concentration and flow (MC1, MC2, or MC3):

$$\text{Monitoring Period LOL (kg/period)} = [(\text{MC (mg/L)} - \text{LC (mg/L)}) \times \text{Flow (MGD)} \times 3.785 \text{ (L/gal)} \times \text{NMBR_OF_DAYS}]$$

- Create two options for Monitoring Period Load-Over-Limit Calculations:
 - LOL1 – If the Monitoring Period LOL is negative, then set the LOL to zero;
 - LOL2 – If the Monitoring Period LOL is negative, then retain the calculated negative value.

For example, if the DMR Monitoring Period Load is 200 and the Limit Monitoring Period Load is 205, then the result for LOL1 would be 0 and the result for LOL2 would be -5. If the DMR Monitoring Period Load is 210 and the limit is 205 then the results for LOL1 and LOL2 would both equal 5.

In Step 5, the ICIS-NPDES Load Calculator sums the LOL1 and LOL2 values for the year to calculate the annual load over limit. The LOL1 method provides the total annual kilograms of pollutant discharges that exceeded permit limits, but does not give credit for monitoring periods

where the discharges were below the permit limit. Summing the LOL2 values provides the net permit limit exceedances for the year.

Step 5: Calculate Annual Totals and Averages. In this step, the ICIS-NPDES Load Calculator calculates the following annual averages and totals for each facility, outfall, monitoring location, limit set designator, and parameter:

- Total Annual Pollutant Load (kg/yr) = Sum of Monitoring Period Loads for three DL Options:
 - BDL = 0
 - BDL = $\frac{1}{2}$ DL; and
 - BDL = DL;
- Annual Average Pollutant Load (kg/day) = Avg of Average Daily Loads for three DL Options:
 - BDL = 0;
 - BDL = $\frac{1}{2}$ DL; and
 - BDL = DL;
- Total Annual Wastewater Flow (MG/yr) = Sum of Monitoring Period Flows;
- Annual Average Wastewater Flow (MGD) = Avg of Average Daily Flows;
- Annual Average Concentration (mg/L) = Avg of Concentrations for three DL Options:
 - BDL = 0;
 - BDL = $\frac{1}{2}$ DL; and
 - BDL = DL;
- Total Load-Over-Limit 1 = Sum of Monitoring Period LOL1;
- Total Load-Over-Limit 2 = Sum of Monitoring Period LOL2; and
- Annual Average Temperature and pH.

Step 6: Estimation Function (EST). Like *PCSLoadCalculator2007* (see Section 3.2.2.2), the ICIS-NPDES Load Calculator estimates discharges for monitoring periods with NODI codes that indicate discharge did not occur. The ICIS-NPDES Load Calculator assumes no discharge for the same NODI codes as *PCSLoadCalculator2007*:

- 2: Operations shutdown;
- 4: Discharge to Lagoon/Groundwater;
- 7: No Influent;
- 9: Conditional Monitoring;
- C: No discharge;
- I: Land Applied;
- J: Recycled – Water-Closed System; and
- W: Dry Lysimeter/Well.

The ICIS-NPDES Load Calculator uses an identical methodology as the EST=YES function used by *PCSLoadCalculator2007*; the ICIS-NPDES Load Calculator normalizes the calculated annual load to 12 months per year using the following equation:

$$\text{Annual Load (kg/yr)} = \text{Sum of Monitoring Period Loads} \times \left(\frac{12}{\text{Sum of NMBR_OF_REPORT}} \right)$$

EPA developed the ICIS-NPDES Load Calculator to allow users to selectively query loads calculated using this estimation function (EST=YES) or without the estimation function (EST=NO). Therefore, the ICIS-NPDES Load Calculator differs from *PCSLoadCalculator2007* in that only one set of annual loads is included in the final ICIS-NPDES annual loads output table. EPA ran the ICIS-NPDES Load Calculator using EST=YES to develop the annual loads for the 2009 annual review.

Step 7: Parameter Grouping. An NPDES permit may require a facility to measure a pollutant in more than one way. For example, a facility may report both total lead and dissolved lead. Because total lead includes dissolved lead, adding the two measurements together overestimates the mass of lead discharged from the facility. To avoid double counting, the ICIS-NPDES Load Calculator can group parameters that represent a single pollutant more accurately¹⁵. The ICIS-NPDES Load Calculator grouping function uses a hierarchy to determine which parameter best represents the total pollutant discharge. For example, copper has eight parameter codes. If a facility reports multiple parameter codes for copper, the ICIS-NPDES Load Calculator uses the following “grouping” hierarchy:

1. Total copper;
2. Copper;
3. Total copper per batch;
4. Total recoverable copper;
5. Dry weight copper;
6. Potentially dissolved copper; and
7. Sum of (dissolved copper and suspended copper).

Table B-7 in Appendix B presents the parameter grouping hierarchy.

Load Calculator Module Output. The ICIS-NPDES Pollutant Loading Tool output contains loads, concentrations, flows, and wastewater stream conditions for each facility, outfall, monitoring location, and parameter as seen in Table 3-13.

¹⁵ EPA also groups parameters in PCS using the same parameter grouping as ICIS-NPDES. The PCS parameter grouping occurs in *DMRLoadsAnalysis2007*. See Section 3.2.4.1 for additional details.

Table 3-13. ICIS-NPDES Load Calculator Module Output

Output Parameter	EST Option	DL Option	Used in Category Rankings?	Purpose
Total Annual Pollutant Loads				
KGY00	No	BDL = 0	No	Not used in Rankings or Sensitivity Analysis
KGYE0	No	BDL = ½ DL	No	Not used in Rankings or Sensitivity Analysis
KGY10	No	BDL = DL	No	Not used in Rankings or Sensitivity Analysis
KGY01	Yes	BDL = 0	Yes	Used with KGYE1 to calculate Hybrid
KGYE1	Yes	BDL = ½ DL	Yes	Used with KGY01 to calculate Hybrid
KGY11	Yes	BDL = DL	No	DL Sensitivity Analysis
Annual Average Daily Loads				
AVG_KGD0	NA	BDL = 0	No	Not used in Rankings or Sensitivity Analysis
AVG_KGDE	NA	BDL = ½ DL	No	Not used in Rankings or Sensitivity Analysis
AVG_KGD1	NA	BDL = DL	No	Not used in Rankings or Sensitivity Analysis
Annual Average Concentrations				
AVG_MGL0	NA	BDL = 0	No	Not used in Rankings or Sensitivity Analysis
AVG_MGLE	NA	BDL = ½ DL	No	Not used in Rankings or Sensitivity Analysis
AVG_MGL1	NA	BDL = DL	No	Not used in Rankings or Sensitivity Analysis
Annual Load-Over-Limit				
SUM_LOL1	NA	NA	No	Not used in Rankings or Sensitivity Analysis
SUM_LOL2	NA	NA	No	Not used in Rankings or Sensitivity Analysis
Average Wastewater Stream Conditions				
AVG_TEMP	NA	NA	No	Not used in Rankings or Sensitivity Analysis
AVG_PH	NA	NA	No	Not used in Rankings or Sensitivity Analysis
Total Annual Wastewater Flow				
MGY	NA	NA	No	Not used in Rankings or Sensitivity Analysis
Annual Average Daily Wastewater Flow				
AVG_MGD	NA	NA	No	Not used in Rankings or Sensitivity Analysis

NA = Not Applicable

3.2.4 DMRLoadsAnalysis2007

As depicted in Figure 3-6, the *DMRLoadsAnalysis2007* database imports annual load tables from *PCSLoadCalculator2007* and the ICIS-NPDES Load Calculator and facility information from PCS and ICIS-NPDES. *PCSLoadCalculator2007* creates annual loads from using the hybrid methodology but without grouping the parameters while ICIS-NPDES Load Calculator groups the parameters but does not apply the hybrid methodology. To create one set of annual loads from the two data sets, *DMRLoadsAnalysis2007* applies the hybrid methodology to the output from the ICIS-NPDES Load Calculator and groups the parameters in the annual load output from *PCSLoadCalculator2007*. *DMRLoadsAnalysis2007* then uses information facility information from PCSFAC and ICIS Facilities and Chemical Abstract Services (CAS) numbers to calculate TWPE and create the “combined” annual loads table (“DMR2007”) that is used by *DMRLoads2007* to generate category rankings. In 2007, 64 percent of the records in the DMR2007 table were from PCS, while the remaining 36 percent were from ICIS-NPDES. Additionally, *DMRLoadsAnalysis2007* uses annual loads from the *PCSLoadCalculator2007* and

ICIS-NPDES Load Calculator outputs to perform a sensitivity analysis on the various calculation assumptions.

Table 3-14 describes the function of each table in *DMRLoadsAnalysis2007*.

Table 3-14. Tables Imported or Created in *DMRLoadsAnalysis2007*

Table Name	Created or Imported	Description
PRAM Codes - PCS	Imported from PCS	Lists pollutants and corresponding parameter codes used for them in PCS.
PRAM Codes – ICIS	Imported from ICIS-NPDES	Lists pollutants and corresponding parameter codes used for them in ICIS-NPDES.
PCS to ICIS-NPDES Parameter Crosswalk	Created	Links PCS parameter codes to ICIS-NPDES parameter codes
Point Source Category/SIC Crosswalk	Imported from <i>TRICalculations2007</i>	Links SIC codes with point source categories using a numeric code assigned in the Point Source Category Codes table.
Point Source Category Codes	Imported from <i>TRICalculations2007</i>	Assigns a numeric code to industrial categories using their 40 CFR Part number or 2-digit or 4-digit SIC code.
SIC Codes	Imported from <i>TRICalculations2007</i>	Lists SIC codes and their descriptions.
SUPERCAS Category	Imported from ICIS-NPDES	Links CAS numbers to pollutant parameter codes.
TWFs	Imported from <i>TRICalculations2007</i>	Assigns TWF values to chemicals by CAS number.
ICIS Facilities	Imported from ICIS-NPDES	Presents information on permitted facilities, such as facility name, location and major/minor discharge status.
PCSFAC	Imported from PCS	Presents information on permitted facilities, such as facility name, location, major/minor discharge status, and date of most recent permit issuance.
DMRFAC2007	Created	Combines PCSFAC and ICISFAC into one table.
DMR2007	Created using queries	Presents the annual loads in pounds per year and TWPE for each pollutant discharge for each outfall at major permitted facilities.
DMR2007 Sensitivity Analysis	Created using queries	Presents the annual loads in pounds per year for each pollutant discharge for each outfall for the five annual loads calculated by <i>PCSLoadCalculator2007</i> and three annual loads calculated by the ICIS-NPDES Load Calculator (see Section 3.2.4.2 and Table 3-16).
Parameter Groupings	Imported from ICIS-NPDES	Lists ICIS-NPDES pollutant parameter codes and their hierarchies for grouping parameters. This table is used to group parameters in both PCS and ICIS-NPDES.

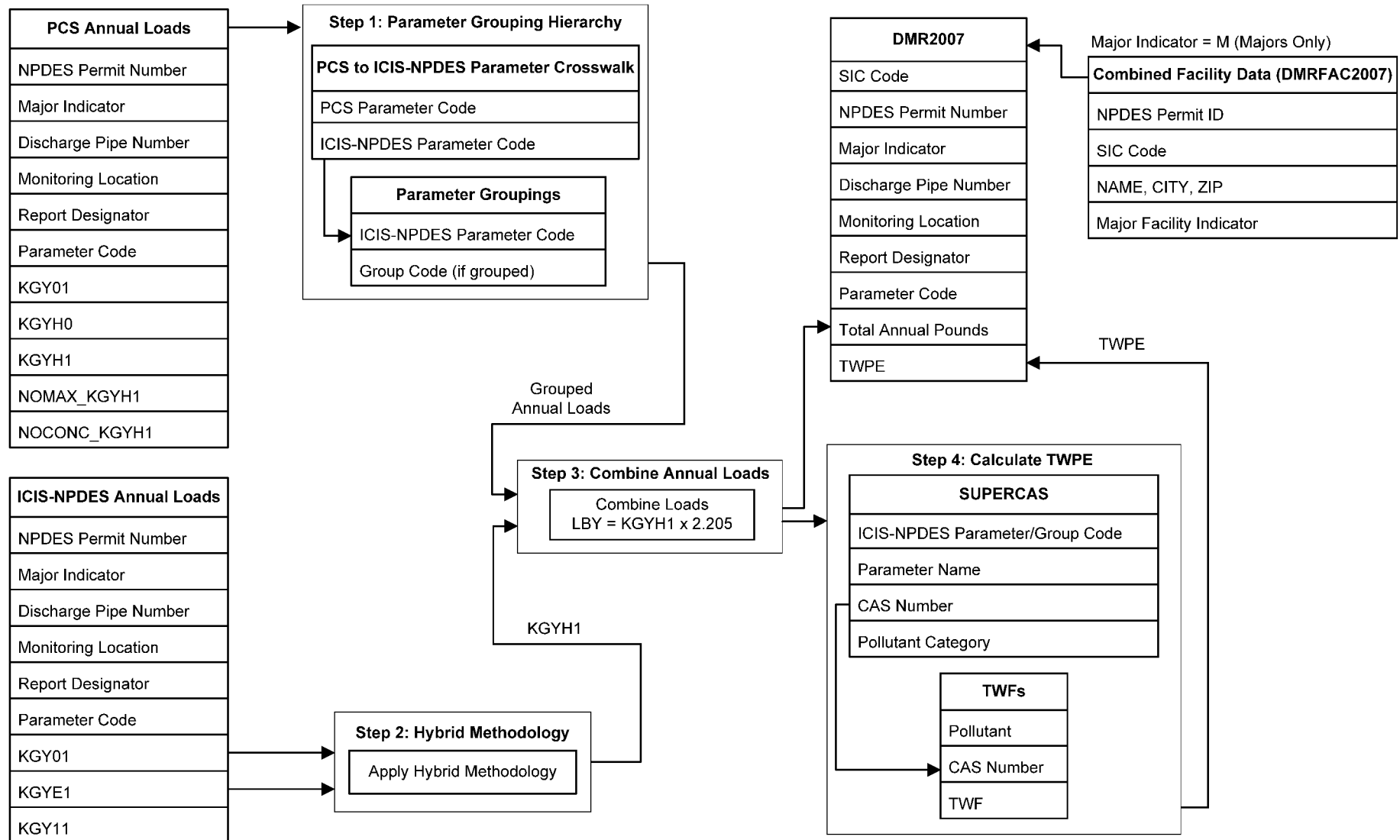


Figure 3-6. DMRLoadsAnalysis2007 Inputs Used to Create DMR2007 Table

3.2.4.1 Creation of DMR2007 Annual Loads Table

The following is a description of the steps EPA took to combine the annual loads from ICIS-NPDES Load Calculator and *PCSLoadCalculator2007* into one table, “DMR2007”.

Step 1: Apply Parameter Grouping Hierarchy to *PCSLoadCalculator2007* Annual Loads. The first step in applying the parameter grouping hierarchy to the annual loads from *PCSLoadCalculator2007* is to convert the PCS parameter codes to ICIS-NPDES parameter codes because there are some parameters that have different parameter codes between the databases. EPA created the PCS to ICIS-NPDES Parameter Crosswalk table, which links the PCS parameter code to the ICIS-NPDES parameter code. EPA then updated the PCS parameter codes in the annual loads tables from *PCSLoadCalculator2007* to the ICIS-NPDES parameter codes.

As discussed in Section 3.2.3.2, a NPDES permit may require a facility to measure a pollutant in more than one way. The annual loads from *PCSLoadCalculator2007* include one load for every parameter reported. To avoid double-counting pollutants, EPA applied the same hierarchy used in the ICIS-NPDES Load Calculator to group the pollutants in the *PCSLoadCalculator2007* annual loading tables (see Table B-7 Appendix B).

Step 2: Apply Hybrid Methodology to ICIS-NPDES Load Calculator Annual Loads. As discussed in Section 3.2.2.2, the output from the ICIS-NPDES Load Calculator includes two annual loads, KGYE1 and KGY01, calculated using BDL=1/2 DL and BDL=0, respectively. EPA applied the Hybrid Method that was used to calculate the *PCSLoadCalculator2007* annual loads to the KGYE1 and KGY01 annual loads from the ICIS-NPDES Load Calculator. See Section 3.2.2.3 for more details on the hybrid methodology.

Step 3: Combine Annual Loads into DMR2007. In 2007, annual loads for 72 facilities were in both *PCSLoadCalculator2007* and the ICIS-NPDES Load Calculator. Because states are currently migrating from PCS to ICIS-NPDES, EPA chose to use the annual loads from ICIS-NPDES Load Calculator for the overlapping outfalls and pollutants¹⁶. Table B-8 in Appendix B presents the list of facilities, outfalls, and pollutants in both PCS and ICIS-NPDES in 2007. EPA used this methodology to combine the two sets of loads into the annual loads table, DMR2007. The DMR2007 table indicates the data source for the calculated annual load.

Step 4: Calculate Toxic Weighted Pound Equivalent. To identify potential impacts on human health and the environment, EPA estimated toxic equivalent mass discharge through the use of TWFs. Section 5 of this report discusses TWFs in more detail. Chemicals for which EAD (Engineering and Analysis Division) has developed TWFs are identified by CAS number. To assign TWFs to reported discharges, EPA used the “SUPERCAS” table, developed in earlier work with PCS and TRI data, to link CAS numbers to pollutant parameters reported in PCS. EPA updated the SUPERCAS table to include ICIS-NPDES parameter codes. EPA has expanded the SUPERCAS list of chemicals by identifying CAS numbers for priority pollutants and chemicals that are frequently reported. EPA obtained the CAS numbers from

¹⁶Facilities may have some outfalls/pollutants that are in both PCS and ICIS-NPDES and other outfalls/pollutants in PCS or ICIS-NPDES only. For example, chlorine data for outfall 001 may be in PCS and ICIS-NPDES, but aluminum data for outfall 001 is only in PCS. In this example, EPA would use the chlorine load reported to ICIS-NPDES and the aluminum load reported to PCS.

www.ChemFinder.com. During the 2009 annual review, as was done during previous annual reviews, EPA made the following assumptions to assign CAS numbers to pollutant parameters:

- All forms of a pollutant were assigned the same CAS number (e.g., Dissolved Copper, Total Recoverable Copper, and Total Copper (as Cu) were all assigned the CAS number for Copper); and
- Chemicals that were reported in different ways were assigned only one CAS number (e.g., Nitrate (as NO₃) and Nitrate (as N) were both assigned the CAS number for Nitrate).

EPA did not identify CAS numbers for chemicals infrequently reported. In addition, there are no CAS numbers for non-chemical parameters reported in ICIS-NPDES and PCS (e.g., total suspended solids, BOD₅, COD, etc.).

Once the CAS numbers were assigned to each parameter using the expanded SUPERCAS table, the TWFs were assigned by matching the CAS numbers. EPA did not assign TWFs to all parameters reported in ICIS-NPDES and PCS. For the 2009 annual review, EPA continued to estimate the TWFs for certain parameters that were reported as chemical groups based on transfers from existing TWFs, as was done during previous annual reviews. Table 3-15 lists these parameters and the method of TWF assignment.

Table 3-15. TWF Assignment for Chemical Mixtures

Parameter Code	Parameter Description	Method of TWF assignment
78216	Aldrin + Dieldrin	Average of aldrin and dieldrin TWFs
82699	Endrin + Endrin Aldehyde (Sum)	Average of endrin and endrin aldehyde TWFs
30383	Benzene, Ethylbenzene, Toluene, and Xylene	Average of benzene, ethylbenzene, toluene, and xylene TWFs
34034	Chlorinated Phenols	Average of the TWFs for PCS parameters 2,4,6-trichlorophenol, pentachlorophenol, 2,4-dichlorophenol, and 2-chlorophenol (most common chlorinated phenols)
74105	Phenols, Chlorinated	Average of the TWFs for PCS parameters 2,4,6-trichlorophenol, pentachlorophenol, 2,4-dichlorophenol, and 2-chlorophenol (most common chlorinated phenols)

3.2.4.2 Sensitivity Analyses

As described in Section 3.2.2.2, EPA developed queries in *PCSLoadCalculator2007* and used annual loads output from ICIS-NPDES Load Calculator to calculate annual loads using the DL=0 alternative method. For this method, the Load Calculators assume a discharge of zero for pollutants that are labeled BDL. EPA combined the annual loads calculated using the DL=0 alternative method from *PCSLoadCalculator2007* and ICIS-NPDES Load Calculator in *DMRLoadsAnalysis2007*.

During previous annual reviews EPA also calculated annual loads using the following alternative methods:

- EST=NO. *PCSLoadCalculator2007* assumes a discharge of zero for monitoring periods where discharge data are missing.
- No Maximum (NOMAX). *PCSLoadCalculator2007* used an alternative measurement selection hierarchy, which set maximum concentrations (MCMX) and maximum quantities (MQMX) to zero during the measurement value selection process.
- No Concentration (NOCONC). *PCSLoadCalculator2007* used an alternative measurement selection hierarchy, which set average concentrations (MCAV), minimum concentrations (MCMN), and maximum concentrations (MCMX) to zero during the measurement value selection process.

EPA did not calculate the annual loads using these alternative methods as part of the 2009 annual review based on the findings of the previous reviews. Section 6.1.2.3 of the *Technical Support Document for the Preliminary 2008 Effluent Guidelines Program Plan* describes the results of the 2007 annual review sensitivity analyses for EST=NO, NOMAX, and NOCONC (U.S. EPA, 2007).

Table 3-16 compares the assumptions and calculation options that the ICIS-NPDES Load Calculator and *PCSLoadCalculator2007* used to calculate each set of annual loads, including the alternative loads that were not calculated as part of the 2009 annual review.

Table 3-16. Comparison of Alternative Load Calculation Methods

Annual Load Set	EST Option	DL Option	Measurements Included in Selection Hierarchy ^a	
Standard Load Calculation				
DMR 2007 (PCS and ICIS-NPDES)	EST=YES	Hybrid (DL=0 or DL=1/2)	MQAV MCMN MCMX	MQMX MCAV
Alternative Load Calculations				
DL=0 (PCS and ICIS-NPDES)	EST=YES	DL=0	MQAV MCMN MCMX	MQMX MCAV
EST=NO ^b	EST=NO	Hybrid	MQAV MCMN MCMX	MQMX MCAV
NOMAX ^b	EST=YES	Hybrid	MQAV MCMN MCMX=0	MQMX=0 MCAV
NOCONC ^b	EST=YES	Hybrid	MQAV MCMN=0 MCMX=0	MQMX MCAV=0

^a For the standard load calculation and DL=0 alternative load calculation in ICIS-NPDES, the measurements included in the selection hierarchy are the five ICIS-NPDES measurements (MQ1, MQ2, MC1, MC2, and MC3).

^b EPA did not calculate these annual loads as part of the 2009 annual review. Section 6.1.2.3 of the *Technical Support Document for the Preliminary 2008 Effluent Guidelines Program Plan* describes the results of these alternative load calculation methods (U.S. EPA, 2007).

EPA examined the impact of each calculation method, shown in Table 3-16, on the calculated pollutant loads in a series of sensitivity analyses. To conduct each sensitivity analysis, EPA calculated TWPE for loads calculated with each alternative method, and compared TWPE calculated using the standard and alternative load calculation methods. EPA made this comparison for total discharge and for the discharges separated into categories. EPA then identified categories and individual facilities within a category that show a large difference between DMR 2007 TWPE and alternative TWPE using the calculations shown below:

$$\text{Amount of TWPE Based on Calculation Alternative (lb-eq/yr)} = \text{Standard Load TWPE (lb-eq/yr)} - \text{Alternative Load TWPE (lb-eq/yr)}$$

$$\text{Percent of TWPE Based on Calculation Alternative} = \frac{\text{Amount of TWPE Based on Calculation Alternative (lb-eq/yr)}}{\text{Standard Load TWPE (lb-eq/yr)}}$$

The following sections discuss the results of the DL sensitivity analyses based on combined 2007 PCS and ICIS-NPDES data.

DL Sensitivity Analysis

The purpose of the DL sensitivity analysis is to evaluate the impact of EPA's use of the Hybrid Method, which estimates loads for some pollutants reported to PCS and ICIS-NPDES as BDL, on the screening-level analysis. Table 3-17 presents a summary of the results of the DL analysis for the point source categories showing the highest sensitivity to the DL options and the total for *DMRLoads2007*. As shown in Table 3-17, only 0.12 percent (1,110,000 lb-eq) of the TWPE in *DMRLoads2007* are based on BDL assumptions using the Hybrid Method. The categories showing the greatest sensitivity to the DL options include Superfund Sites, the Pulp, Paper and Paperboard Category, and the Petroleum Refining Category. For the complete results of the DL sensitivity analysis see Table B-9 in Appendix B. Table B-10 in Appendix B presents the results of the sensitivity analysis by pollutant. Pollutant parameters showing the highest sensitivity to the DL options include 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD), TCDD equivalents, and chlorine.

Table 3-17. Results of DL Sensitivity Analysis

Point Source Category	Total Number of Facilities	Number of Facilities Affected by DL	Total Annual Load, lb/yr	Total Annual Load Based on DL, lb/yr	Total TWPE, lb-eq/yr	Total TWPE Based on DL, lb-eq/yr
Sanitary Services (SIC 4959)	2	1	653,000	9,450 (1.5%)	2.69	1.35 (50%)
Pulp, Paper, and Paperboard (40 CFR Part 430)	217	78	2,450,000,000	70,800,000 (2.9%)	2,730,000	347,000 (13%)
Trucking and Warehousing (SIC Group 42)	2	1	83,300	613 (0.7%)	57.6	5.24 (9.1%)
Pesticide Chemicals (40 CFR Part 455)	147	28	3,840,000,000	109,000 (0.002%)	180,000	8,980 (5%)
Airport Deicing (PNC)	5	2	1,160,000	30,000 (2.6%)	265	9.02 (3.4%)
Petroleum Refining (40 CFR Part 419)	108	65	1,950,000,000	153,000,000 (7.8%)	403,000	13,000 (3.2%)
Nonferrous Metals Manufacturing (40 CFR Part 421)	36	14	188,000,000	30,700,000 (16%)	343,000	10,200 (3%)
Organic Chemicals, Plastics, and Synthetic Fibers (40 CFR Part 414)	219	89	1,480,000,000	114,000,000 (7.7%)	413,000	6,310 (1.5%)
Non-classifiable Establishments (SIC Group 99)	10	2	24,800,000	1,560 (0.01%)	2,070	19 (0.9%)
Independent and Stand Alone Labs (PNC)	6	4	465,000	10,100 (2.2%)	5,360	27.7 (0.5%)
Total DMRLoads2007	2,177	1,025	43,100,000,000	3,830,000,000	942,000,000	1,110,000

Source: DMRLoads2007_v3.

PNC – Potential new category.

3.2.5 DMRNutrients2007

DMRNutrients2007 uses the annual loads for nitrogen and phosphorus compounds from the DMR2007 table to calculate aggregate nitrogen as N and phosphorus as P loads for each facility outfall. The database sums the aggregate nitrogen and phosphorus loads by facility and by point source category. Table B-11 of Appendix B presents the category rankings for total nitrogen as N loads and Table B-12 presents the category rankings for total phosphorus as P loads.

DMR data include discharges of nitrogen and phosphorus in various chemical forms. For example, nitrogen may be reported in its elemental form (as N), total Kjeldahl nitrogen (TKN), organic nitrogen, ammonia as N, ammonia as NH_3 or NH_4 , un-ionized ammonia, nitrite, or nitrate. EPA developed a series of hierarchies to select the appropriate combination of nitrogen and phosphorus compounds to calculate the total nitrogen and total phosphorus loads. These hierarchies, summarized below, are described in detail in “Point Source Category Rankings by Nitrogen and Phosphorus Loads Calculated Using 2002 PCS Data” (Kandle, 2005a).

Total Nitrogen Load

EPA calculated total nitrogen using one of the following equations (presented in order of use):

- Total Nitrogen Load = Total Nitrogen as N;
- Total Nitrogen Load = TKN + Nitrite (NO_2) + Nitrate (NO_3); or
- Total Nitrogen Load = Organic Nitrogen + Ammonia + Nitrite + Nitrate.

Nitrogen compounds that are reported as NH_3 , NH_4 , NO_2 , or NO_3 were converted to N based on molecular weight, then summed to calculate Total Nitrogen Load. Table 3-18 presents the conversion factors EPA used for nitrogen compounds.

Table 3-18. Conversion Factors for Nitrogen Compounds

Nitrogen Compound	Conversion Factor
Ammonia as NH_3	14 N / 17 NH_3
Nitrite as NO_2	14 N / 46 NO_2
Nitrate as NO_3	14 N / 62 NO_3

Total Phosphorus Load

Loads for phosphorus parameters were grouped by EPA’s grouping hierarchy described in Section 3.2.2 and assigned to a grouped parameter code. As a result, *DMRNutrients2007* includes only two parameters for phosphorus compounds. EPA used the following hierarchy to calculate total phosphorus load:

- If loads of phosphorus (PRAM PHOSP) were available, EPA used the PRAM PHOSP load to represent total phosphorus. EPA assumed that the majority of the loads were reported as phosphorous and did not apply a conversion factor to calculate pounds of phosphorous.

- If loads of phosphorus (PRAM PHOSP) were not available, EPA used loads of phosphate (PRAMs PO4). EPA multiplied the load by 31/95 to convert the reported phosphate load to pounds of phosphorous.

3.2.6 *DMRLoads2007*

As the final step in developing *DMRLoads2007*, EPA grouped discharges from *DMRLoadAnalysis2007* to create the point source category rankings and to perform other analyses. Section 3.2.6.1 discusses the tables and table structure of *DMRLoads2007*, and Section 3.2.6.2 discusses the SIC/Point Source Category Crosswalk in relation to *DMRLoads2007* tables.

3.2.6.1 *DMRLoads2007* Structure

Table 3-19 lists and describes the tables in *DMRLoads2007*.

Table 3-19. Tables Imported or Created in *DMRLoads2007*

Table Name	Created or Imported	Description
PRAM Codes	Linked from <i>DMRLoadAnalysis2007</i>	Lists pollutants and corresponding parameter codes.
SIC/Point Source Category Crosswalk	Linked from <i>DMRLoadAnalysis2007</i>	Links SIC codes with point source categories using a numeric code assigned in the Point Source Category Codes table.
Point Source Category Codes	Linked from <i>DMRLoadAnalysis2007</i>	Assigns a numeric code to industrial categories using their 40 CFR part number or 2-digit or 4-digit SIC Code.
SIC Codes	Linked from <i>DMRLoadAnalysis2007</i>	Lists SIC codes and their descriptions.
SUPERCAS Category	Linked from <i>DMRLoadAnalysis2007</i>	Links CAS numbers to pollutant parameter codes.
TWFs	Linked from <i>TRICalculations2007</i>	Assigns TWF values to chemicals by CAS number.
DMRFAC	Linked from <i>DMRLoadAnalysis2007</i>	Presents information on permitted facilities, such as facility name, location, major/minor discharge status, and date of most recent permit issuance
DMR2007	Linked from <i>DMRLoadAnalysis2007</i>	Presents the annual loads in pounds per year and TWPE for each pollutant discharge for each outfall at major permitted facilities.
Manual ICIS Loads Corrections	Created	Lists ICIS-NPDES loads corrections identified by manual review.
Category Rankings – Nitrogen	Linked from <i>DMRNutrients2007</i>	Presents rankings of categories based on aggregated nitrogen load.
Category Rankings – Phosphorus	Linked from <i>DMRNutrients2007</i>	Presents rankings of categories based on aggregated phosphorus load.
SIC Code Rankings	Created using queries	Presents rankings of SIC codes based on calculated TWPE.
Category Rankings – Toxic Weight	Created using queries	Presents rankings of categories based on calculated TWPE.

3.2.6.2 SIC/Point Source Category Crosswalk

DMRLoads2007 assigns a facility's discharge to an industrial category using 4-digit SIC codes. Point source categories are not generally defined by SIC codes. As a result, EPA developed a crosswalk that links point source categories to 4-digit SIC codes, described in Section 1 of this document. EPA has developed ELGs for point source discharges from 56 specific categories. The point source categories, which may be divided into subcategories, are generally defined in terms of combinations of products made and the processes used to make these products. Facilities with data in PCS and ICIS-NPDES are identified by SIC code. Thus, to use the PCS and ICIS-NPDES data to estimate the pollutants discharged by each point source category, EPA assigned each 4-digit SIC code to an appropriate point source category using the "SIC/Point Source Category Crosswalk" table. See Section 4.2 for additional information on the development of the SIC/Point Source Category Crosswalk.

As shown in Figure 3-7, *DMRLoads2007* links information from the DMR2007 Table, DMRFAC, and the SIC/Point Source Category Crosswalk to create point source category rankings. The SIC codes in the DMR2007 Table are specific to each parameter, discharge pipe (outfall), and facility (NPDES permit number). This allows EPA to make SIC adjustments to differentiate between various operations/outfalls at one facility and assign discharges at the pollutant level to different point source categories, as described in Section 4.2.1.2.

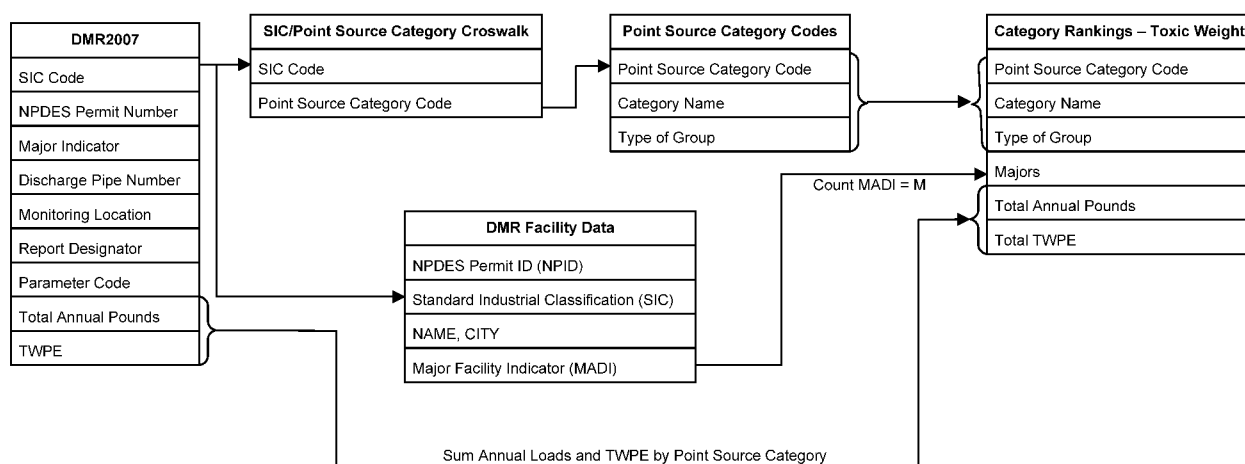


Figure 3-7. DMRLoads2007 Database Structure

3.2.7 Database Corrections

EPA reviewed *DMRLoads2007* output for reasonableness, as described in Section 3.4. Also, during previous screening-level analyses, EPA identified facility-specific corrections for PCS data. Several of these corrections similarly apply to the 2007 DMR data. In addition, EPA's quality review (see Section 3.4) identified other corrections to the 2007 DMR data, (e.g., units incorrectly reported as gallons per day were corrected to MGD). Table B-13 in Appendix B lists all corrections made to the 2007 DMR data. In addition to the facility-specific data corrections, *DMRLoadsAnalysis2007* performs the following modifications to the annual loads:

- **Categorization of Discharges.** Section 1 of this report describes the development of the SIC/Point Source Category Crosswalk, which EPA uses to link between facility SIC codes and categories with existing ELGs. Because most point source categories are not defined by SIC code, the relationship between SIC code and point source category is not a one-to-one correlation. A single SIC code may include facilities in more than one point source category, and associating an SIC code with only one category may be an over simplification. Also, many facilities have operations subject to more than one point source category. Further, facilities in some categories cannot be identified by SIC code (e.g., Centralized Waste Treatment facilities). The database changes are summarized below:
 - *Facility-Level Point Source Category Assignment.* For some SIC codes that include facilities subject to guidelines from more than one point source category, EPA was able to assign each facility to the category that best applied to the majority of its discharges. EPA reviewed information available about each facility to determine which point source category applied to the facility's operations.
 - *Pollutant-Level Point Source Category Assignment.* Many facilities have operations subject to more than one point source category. For most of these facilities, EPA cannot divide the pollutant discharges among the applicable point source categories. Two exceptions where EPA was able to assign wastewater discharges of certain chemicals to the appropriate point source category include Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) /Pesticides and MP&M/Metal Finishing (see Section 4.2.1.2 for additional discussion).

Table 3-20 shows the facilities for which EPA revised SIC codes to link to an appropriate point source category based on known plant operations.

- **Internal Monitoring.** As described in Sections 3.2.2.2 and 3.2.3.2, *PCSLoadCalculator2007* and the ICIS-NPDES Load Calculator calculated loads only for monitoring locations that are labeled as effluent (MLOC 1 or 2 in PCS and MLOC 1, 2, A, B, or SC in ICIS-NPDES). For the 2009 annual review, EPA included only MLOC 1 and 2 for ICIS-NPDES. EPA will include MLOC A, B, and SC in future annual reviews. As a result, the Load Calculators exclude discharges for internal monitoring locations such as intake water, influent to treatment, and intermediate points in the wastewater treatment system. However, during previous category reviews and detailed studies, EPA identified instances of double counting that resulted from including certain internal monitoring points in the loads database. For example, a facility monitors for Pollutant A at the effluent from its wastewater treatment system (Internal Outfall 101). Outfall 101 wastewater is later combined with other plant discharges at final Outfall 001 and is discharged to a receiving stream. The facility also monitors for Pollutant A at Final Outfall 001. Both outfalls are effluent monitoring points identified as MLOC 1 or MLOC 2; however, Outfall 101 is upstream of the final outfall. Calculating loads for Pollutant A at both the internal and final outfalls results in double counting Pollutant A discharges. EPA identified instances where pollutant discharges are reported for multiple monitoring locations along the same

discharge line, and eliminated the discharges for the upstream monitoring locations. EPA made these corrections in *PCSLoadCalculator2007* for the PCS data and in *DMRLoadsAnalysis2007* for the ICIS-NPDES data (see Table B-13 in Appendix B).

- **Intermittent Discharges.** As described in Sections 3.2.2.2 and 3.2.3.2, in *PCSLoadCalculator2007* and the ICIS-NPDES Load Calculator EPA assumes that all discharges in PCS and ICIS-NPDES are continuous. During previous Annual Reviews, EPA identified facility discharges that are intermittent and therefore overestimated by the Load Calculator. EPA calculated annual loads for these discharges based on information obtained from the facility on the frequency and duration of wastewater discharges. EPA made these corrections in *PCSLoadCalculator2007* for the PCS data and in *DMRLoadsAnalysis2007* for the ICIS-NPDES data (see Table B-13 in Appendix B).
- **Pollutant Parameters Excluded from *DMRLoads2007*.** Parameters in PCS and ICIS-NPDES include water quality parameters (e.g., dissolved oxygen and temperature), specific chemicals (e.g., phenol), bulk parameters (e.g., biochemical oxygen demand), and flow. As described in Sections 3.2.2.2 and 3.2.3.2, facilities report pollutant mass quantities, pollutant concentrations, and wastewater flow rates to PCS and ICIS-NPDES using a variety of units. EPA's PCS CNVRT program and the ICIS-NPDES convert module convert the discharges into standard units of kilograms per day for mass quantities, milligrams per liter for concentrations, and millions of gallons per day for flow rates. However, some parameters are reported in units that cannot be converted into kg/day or mg/L (e.g. temperature and pH). EPA excluded these parameters from the screening-level analysis. Table B-14 of Appendix B lists the excluded parameters.
- **ICIS-NPDES Load Corrections.** In some cases, EPA identified that loads are not estimated correctly because of errors in units, number of reporting periods, detection limit estimation, improperly-coded outfalls, or other data entry errors. For data in PCS, EPA made corrections in the *PCSLoadCalculator* database. For data from ICIS-NPDES, EPA corrected loads in *DMRLoadsAnalysis2007*. Table B-13 in Appendix B lists these case-by-case ICIS Loads corrections.

Table 3-20. Case-by-Case Point Source Category Reassignments in DMRLoads2007

NPID	Name	Old SIC Code	Old Point Source Category	New SIC Code ^a	New Point Source Category
TN0002968	US DOE-Oak Ridge Y12 Plant	9611	Administration Of Economic Programs	3499	Metal Finishing
OH0048836	Duke Energy, Ohio, Inc.	4932	Electric, Gas, & Sanitary Services	4911	Steam Electric Power Generating
MD0000060	Perdue Farms, Inc.	2048	Food & Kindred Products	2048GRAIN	Grain mills
MO0002356	BCP Ingredients, Inc	2048	Food & Kindred Products	2048GRAIN	Grain mills
MS0046931	Scott County	2048	Food & Kindred Products	2048MPP	Meat and Poultry Products
MS0002941	Lawrence County	2861	Gum And Wood Chemicals Manufacturing	2621-2	Pulp, Paper And Paperboard
AL0000213	Occidental Chemical Corp	2813	Inorganic Chemicals Manufacturing	VCCA	Chlorine And Chlorinated Hydrocarbons
AL0001945	Olin Chlor Alkali Products	2812	Inorganic Chemicals Manufacturing	VCCA	Chlorine And Chlorinated Hydrocarbons
AL0003514	Occidental Chemical Corp	2812	Inorganic Chemicals Manufacturing	VCCA	Chlorine And Chlorinated Hydrocarbons
DE0050911	Diamond Shamrock Chemicals Co.	2812	Inorganic Chemicals Manufacturing	VCCA	Chlorine And Chlorinated Hydrocarbons
KY0003484	Westlake Ca&O Corp	2812	Inorganic Chemicals Manufacturing	VCCA	Chlorine And Chlorinated Hydrocarbons
KY0102083	USEC PDGDP	2819	Inorganic Chemicals Manufacturing	2819NMM	Nonferrous Metals Manufacturing
LA0005231	Pioneer Chlor Alkali Co., Inc	2812	Inorganic Chemicals Manufacturing	VCCA	Chlorine And Chlorinated Hydrocarbons
LA0005983	Occidental Chemical Corp	2812	Inorganic Chemicals Manufacturing	VCCA	Chlorine And Chlorinated Hydrocarbons
LA0029769	IMC-Phosphates Company	2819	Inorganic Chemicals Manufacturing	2873	Fertilizer Manufacturing
ME0000639	Holtachem Mfg	2812	Inorganic Chemicals Manufacturing	9999	Non Classifiable Establishments
NV0020923	Pioneer Americas-BMI Complex	2812	Inorganic Chemicals Manufacturing	VCCA	Chlorine And Chlorinated Hydrocarbons
NY0001635	Olin Corp - Niagara Falls Plt	2812	Inorganic Chemicals Manufacturing	VCCA	Chlorine And Chlorinated Hydrocarbons
NY0003328	E I Dupont De Nemours & Co, Inc	2812	Inorganic Chemicals Manufacturing	VCCA	Chlorine And Chlorinated Hydrocarbons
NY0003336	Occidental Chemical Corp	2812	Inorganic Chemicals Manufacturing	VCCA	Chlorine And Chlorinated Hydrocarbons
OH0115401	Us Enrichment Corp Ports Gaseo	2819	Inorganic Chemicals Manufacturing	2819NMM	Nonferrous Metals Manufacturing
TN0002461	Olin Chemicals Corp.	2812	Inorganic Chemicals Manufacturing	VCCA	Chlorine And Chlorinated Hydrocarbons
TX0007412	Deer Park Plant	2812	Inorganic Chemicals Manufacturing	VCCA	Chlorine And Chlorinated Hydrocarbons
TX0008150	Oxy Vinyls, Lp, Harris County	2812	Inorganic Chemicals Manufacturing	VCCA	Chlorine And Chlorinated Hydrocarbons
WI0003565	Erco Worldwide Usa Inc Pt Edw	2812	Inorganic Chemicals Manufacturing	VCCA	Chlorine And Chlorinated Hydrocarbons
WV0000108	Kincaid Enterprises	2819	Inorganic Chemicals Manufacturing	2879	Pesticide Chemicals
WV0004359	Ppg Industries, Inc.	2812	Inorganic Chemicals Manufacturing	VCCA	Chlorine And Chlorinated Hydrocarbons

Table 3-20. Case-by-Case Point Source Category Reassignments in DMRLoads2007

NPID	Name	Old SIC Code	Old Point Source Category	New SIC Code^a	New Point Source Category
AR0037800	Clean Harbors El Dorado, LLC	4953	Landfills	4953WC	Waste Combustors
LA0038245	Clean Harbors Baton Rouge, LLC	4953	Landfills	CWT	Centralized Waste Treatment
LA0065501	Clean Harbors White Castle LLC	4953	Landfills	CWT	Centralized Waste Treatment
MO0108472	Front St Remedial Action	4953	Landfills	SUPER	Superfund Sites
TN0074225	Ettp-Central Neutraliz. Fac	4953	Landfills	4953WC	Waste Combustors
TX0005941	Clean Harbors Deer Park WWTP	4953	Landfills	4953WC	Waste Combustors
TX0030937	Vopak Logistics Services USA	4953	Landfills	CWT	Centralized Waste Treatment
TX0091855	Stolthaven Houston, Inc.	4953	Landfills	CWT	Centralized Waste Treatment
ME0001872	Domtar Maine Corporation	2411	Lumber & Wood Products	2411-1	Pulp, Paper And Paperboard
IL0001724	American Nickeloid Co-Peru	3471	Metal Finishing	3471CC	Coil Coating
TN0002488	State Ind-Ashland Cty	3639	Metal Finishing	3639PE	Porcelain Enameling
TN0003671	Usa Holston Army Ammo Plt Area	9711	National Security & International Affairs	2892	Explosives Manufacturing
AL0002658	Anniston Army Depot	9999	Non Classifiable Establishments	3795	Metal Finishing
AL0026832	Golden Rod Broilers	9999	Non Classifiable Establishments	2015	Meat and Poultry Products
CO0042480	Eagle Mine Remediation WWTP	9999	Non Classifiable Establishments	9999	Non Classifiable Establishments
MI0004227	Dsc Ltd	9999	Non Classifiable Establishments	3316	Iron And Steel Manufacturing
NY0006548	Owl Wire & Cable Inc - Rome Fac	9999	Non Classifiable Establishments	3351	Copper forming
OH0004219	Timken Company - Canton	9999	Non Classifiable Establishments	3562	Metal Finishing
OH0004260	AK Steel Coshocton Stainless	9999	Non Classifiable Establishments	3312	Iron And Steel Manufacturing
OH0098540	Reserve Environmental Services	9999	Non Classifiable Establishments	CWT	Centralized Waste Treatment
AL0054704	Sabic Innovative Plastics	2821	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
DE0000612	Formosa Plastics Corporation	2821	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
IL0001350	Formosa Plastics-Illinois	2821	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
IN0002101	Sabic Innovative Plastics Mt Ve	2821	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons

Table 3-20. Case-by-Case Point Source Category Reassignments in DMRLoads2007

NPID	Name	Old SIC Code	Old Point Source Category	New SIC Code ^a	New Point Source Category
LA0000761	PPG - Lake Charles	2869	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
LA0002933	Occidental Chemical Corp.	2869	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
LA0003301	Dow Chemical - Plaquemine	2869	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
LA0006149	Formosa Plastics Corp	2869	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
LA0006220	Crompton Manufacturing Co.	2869	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
LA0007129	Georgia Gulf Corporation	2869	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
LA0041025	Certainteed Corporation	2821	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
LA0056171	Occidental Chemical Corporatio	2869	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
NJ0004286	Polyone Corporation	2821	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
NJ0004391	Colorite Polymers Company	2821	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
OH0007269	Dover Chemical Subsidiary Of I	2869	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
TX0002798	Wwtp	2869	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
TX0006335	Oxy Vinyls, Lp	2821	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
TX0006483	Dow Chemical	2869	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
TX0070416	Vinyl Chloride Monomer Plant	2869	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
TX0085570	Formosa Point Comfort Plant	2869	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons

Table 3-20. Case-by-Case Point Source Category Reassignments in DMRLoads2007

NPID	Name	Old SIC Code	Old Point Source Category	New SIC Code^a	New Point Source Category
TX0104876	Organic Chemical Manufacturing	2869	Organic Chemicals, Plastics And Synthetic Fibers	VCCA	Chlorine And Chlorinated Hydrocarbons
CT0003212	Kimberly-Clark Corporation	2676	Paper & Allied Products	2621-2	Pulp, Paper And Paperboard
OK0040827	Kimberly-Clark Corp-Jenks Fac	2676	Paper & Allied Products	2611-2	Pulp, Paper And Paperboard
MS0001309	Adams County	2911	Petroleum Refining	2611-2	Pulp, Paper And Paperboard
TX0062677	North Regional Treatment Plant	2911	Petroleum Refining	CWT	Centralized Waste Treatment
LA0004847	Mosaic Fertilizer, LLC	2874	Phosphate Manufacturing	2874FER	Fertilizer Manufacturing
MS0003115	Jackson County	2874	Phosphate Manufacturing	2874FER	Fertilizer Manufacturing
GA0046973	Fort James Operating Company	2621	Pulp, Paper And Paperboard	VCCA	Chlorine And Chlorinated Hydrocarbons
OK0034321	Fort James Oprating Co-Muskoge	2621	Pulp, Paper And Paperboard	VCCA	Chlorine And Chlorinated Hydrocarbons
WI0001848	Georgia Pacific Consumer Prod	2621	Pulp, Paper And Paperboard	VCCA	Chlorine And Chlorinated Hydrocarbons
OR0020834	St. Helens STP/Boise Cascade	4952	Sewerage Systems	2621-1	Pulp, Paper And Paperboard
CO0042064	Treatment, Storage & Disposal	4953	Waste Combustors	4953L	Landfills
LA0038245	Clean Harbors Baton Rouge, LLC	4953	Waste Combustors	CWT	Centralized Waste Treatment
LA0065501	Clean Harbors White Castle LLC	4953	Waste Combustors	CWT	Centralized Waste Treatment
LA0066214	NPC Services-Alsen	4953	Waste Combustors	4953L	Landfills
MO0108472	Front St Remedial Action	4953	Waste Combustors	SUPER	Superfund Sites
NJ0005240	Safety-Kleen - Bridgeport	4953	Waste Combustors	4953L	Landfills
TX0030937	Vopak Logistics Services USA	4953	Waste Combustors	CWT	Centralized Waste Treatment
TX0091855	Stolthaven Houston, Inc.	4953	Waste Combustors	CWT	Centralized Waste Treatment
MO0001716	Basf Hannibal Plant	5191	Wholesale Trade- Nondurable Goods	2879	Pesticide Chemicals

Source: DMRLoads2007_v3.

^a Because some point source categories correspond to multiple SIC codes, some changes to SIC codes did not result in a change in point source category assignment. These SIC changes are not shown in the table.

3.3 Results of the Preliminary Analysis

This section presents the results of the *DMRLoads2007* database. Table 3-22 presents the categories ranked from highest to lowest TWPE. Table B-1 of Appendix B presents the four-digit SIC code rankings by TWPE. Table B-2 of Appendix B presents the total TWPE for pollutant parameters reported in DMR.

3.4 Data Quality Review

EPA evaluated the quality of the PCS and ICIS-NPDES DMR data for use in the 2009 screening-level review. This evaluation considered data completeness, accuracy, reasonableness, and comparability. The *Quality Assurance Project Plan for the 2009 Annual Screening-Level Analysis of TRI and PCS Industrial Category Discharge Data* (ERG, 2009) describes the quality objectives in more detail. EPA conducted quality reviews for four stages of the development of *DMRLoads2007*: PCS CNVRT program output; ICIS-NPDES Convert Module output; *PCSLoadCalculator2007* and the ICIS-NPDES Pollutant Loading Tool output; and *DMRLoads2007* results. The following discussion provides an overview of the quality review steps for each stage:

- **PCS CNVRT program output.** EPA's quality review of the CNVRT output files included reasonableness checks of pollutant quantities and concentrations. EPA reviewed the CNVRT program output (i.e., the pollutant discharges stored in PCS converted into standard units of kg/day and mg/L) to identify possible errors in recording units of measure. EPA reviewed ranges of pollutant quantities and concentrations and identified pollutant measurements and flows that were unreasonably high. EPA then compared these measurements with measurements available on EPA's Envirofacts web page. If the measurements were similar EPA concluded that the CNVRT file output was acceptable. This review resulted in two types of systematic corrections to the CNVRT output:
 - Corrections to 1,015 flows ranging from 1,300 MGD to 5,000 MGD¹⁷ (see Section 3.2.2.2); and
 - Corrections to 284 mercury concentrations reported to PCS using PRAM 50092 (Mercury Total Low Level) (see Section 3.4.1).
- **ICIS-NPDES Convert Module output.** EPA conducted an initial quality review of the extracted ICIS-NPDES DMR data to evaluate its completeness, reasonableness, and comparability. For completeness, EPA compared the number of major facilities and the universe of SIC codes in the 2007 ICIS-NPDES DMR data to the PCS DMR data in 2004, the last complete DMR data set for ICIS-NPDES states. The 2007 ICIS-NPDES data had at least as many majors and SIC codes as PCS in 2004. Additionally, EPA verified that, while PCS 2004 had more parameter codes than ICIS-NPDES in 2007, all commonly reported parameters are present in the 2007 ICIS-NPDES DMR data.

¹⁷ In addition to these systematic flow corrections, EPA determined that all flows between 1,000 and 5,000 MGD reported by facilities in Ohio were flows in GPD. EPA automatically divided these flows by 1,000,000. However, because power plants are known to have high flows, EPA made flow corrections to Ohio facilities reporting SIC code 4911 (Electrical Services) on a case-by-case basis.

EPA reviewed the DMR data for reasonableness to identify any data quality issues, such as misreported units that the ICIS-NPDES Convert Module did not correct. EPA identified several wastewater flows that exceeded the reasonable range. EPA reviewed these flows and developed the proposed flow correction function for the ICIS-NPDES Convert Module (described in Section 3.2.3.1). This function is designed to identify data entry errors for flows greater than 1,000 MGD. The ICIS-NPDES Convert Module corrects all flows exceeding 5,000 MGD, and applies more conservative criteria to correct flows from 1,000 to 5,000 MGD. The ICIS-NPDES Convert Module made following corrections to ICIS-NPDES wastewater flows:

- 1,113 corrections based on month-to-month variations;
- 1,605 corrections based on comparing flows to design flows; and
- 142 corrections based on assuming that flows exceeding 5,000 MGD were reported in units of GPD.

EPA also evaluated the comparability of the extracted 2007 ICIS-NPDES DMR data to the 2004 PCS data. As shown in Table 3-21, most of the average loads and concentrations in ICIS-NPDES are within one order of magnitude of the 2004 PCS data. However, the maximum loads and concentrations indicate that there may be some unreasonable values in the 2007 ICIS-NPDES DMR data. EPA verified the unit conversions used in the ICIS-NPDES Convert Module and for this reason concluded that the unreasonable flows and pollutant measurements are likely the result of data entry errors and are not the result of any errors in the ICIS-NPDES Convert Module functions.

Table 3-21. Comparison of Load and Concentration Ranges for Common Parameters

Pollutant	Average 2004 PCS Quantity (kg/day)	Maximum 2004 PCS Quantity (kg/day)	Average 2004 PCS Conc. (mg/L)	Maximum 2004 PCS Conc. (mg/L)	Average 2007 ICIS- NPDES Quantity (kg/day)	Maximum 2007 ICIS- NPDES Quantity (kg/day)	Average 2007 ICIS- NPDES Conc. (mg/L)	Maximum 2007 ICIS- NPDES Conc. (mg/L)
Aluminum	77	4,755	19	3,333	15	72	10	5,620
Ammonia	154	1,873	2.8	116	343	7,082	8.8	147
BOD	1,296	275,456	1,773	6,690,000	802	3,490,205	134	290,171
Chlorine	0.90	692	0.5	1,420	1.5	1,647	0.46	60,000
Copper	0.42	244	2.7	1,042	0.20	123	0.11	850
Iron	241	51,812	2.7	19,450	165	46,530	3.6	2,800
Nitrogen	53	19,985	6.9	2,701	818	43,584	20	114,598
Oil and Grease	41	5,953	3.2	9,400	195	10,651	5.4	380
Phosphate	43	5,953	3.3	9,400	6.5	30	4.4	93
Phosphorus	583	131,464	20	8,104	39	152,101	2.1	20,990
TKN	65	5,117	15	3,400	298	9,403	2,348	240,000
TSS	457	131,429	838	73,500	574	3,405,402	93	380,800
Zinc	1.89	1,046	1.3	1,360	0.67	1,308	0.46	769

Sources: *PCSLoadCalculator2004* and the ICIS-NPDES Pollutant Loading Tool.

Table 3-22. DMR 2007 Point Source Category Rankings by TWPE

40 CFR Part	Point Source Category	Number of Facilities	Total Pounds	Total TWPE
NA	Superfund Sites	1	1,331,644	909,115,642
423	Steam Electric Power Generating	550	25,138,490,268	20,374,829
433	Metal Finishing	111	77,793,914	3,361,768
430	Pulp, Paper And Paperboard	217	2,449,186,965	2,726,865
414.1 ^a	Chlorine And Chlorinated Hydrocarbons	40	1,583,223,789	1,220,744
418	Fertilizer Manufacturing	21	125,646,884	1,095,046
420	Iron And Steel Manufacturing	90	672,371,411	730,252
432	Meat and Poultry Products	44	673,799,975	535,913
414	Organic Chemicals, Plastics And Synthetic Fibers	219	1,484,731,242	413,226
419	Petroleum Refining	108	1,952,697,634	402,506
415	Inorganic Chemicals Manufacturing	55	1,173,945,339	393,523
421	Nonferrous Metals Manufacturing	36	187,923,634	342,747
440	Ore Mining And Dressing	54	470,835,865	184,455
455	Pesticide Chemicals	139	3,843,462,966	179,697
471	Nonferrous Metals Forming And Metal Powders	14	5,496,943	119,244
NA	Drinking Water Treatment	13	1,135,551,072	119,190
410	Textile Mills	48	29,467,857	79,934
429	Timber Products Processing	5	99,888,774	51,552
417	Soap And Detergent Manufacturing	2	230,007	47,815
NA	National Security & International Affairs	35	92,583,865	38,983
444	Waste Combustors	10	19,162,733	38,412
445	Landfills	10	18,668,498	35,804
409	Sugar Processing	21	698,918,657	32,520
436	Mineral Mining And Processing	34	264,924,182	26,719
439	Pharmaceutical Manufacturing	28	43,720,508	24,937
463	Plastics Molding And Forming	6	88,969,293	24,626
422	Phosphate Manufacturing	12	62,276,423	18,459
467	Aluminum forming	12	15,781,323	12,182
464	Metal Molding And Casting (Foundries)	7	6,019,649	11,271
428	Rubber Manufacturing	17	8,947,786	11,195
454	Gum And Wood Chemicals Manufacturing	2	838,168	10,478
437	Centralized Waste Treatment	6	120,470,939	10,403
469	Electrical And Electronic Components	5	2,665,896	9,350
411	Cement Manufacturing	6	63,110,706	8,960
NA	Engineering & Management Services	1	3,284,525	5,978
NA	Miscellaneous Foods And Beverages	8	94,045,452	5,842
NA	Independent And Stand Alone Labs	6	465,432	5,355

Table 3-22. DMR 2007 Point Source Category Rankings by TWPE

40 CFR Part	Point Source Category	Number of Facilities	Total Pounds	Total TWPE
424	Ferroalloy Manufacturing	3	7,905,371	4,349
408	Canned And Preserved Seafood Processing	8	124,735,909	3,232
468	Copper forming	9	2,928,183	2,310
434	Coal Mining	9	44,228,933	2,294
NA	Non Classifiable Establishments	10	24,794,788	2,066
406	Grain mills	14	28,624,175	1,984
407	Canned And Preserved Fruits And Vegetables Processing	11	7,177,438	1,757
443	Paving And Roofing Materials (Tars And Asphalt)	4	494,518	1,280
461	Battery Manufacturing	1	136,061	1,096
NA	Amusement & Recreation Services	1	118,566	1,025
NA	Printing & Publishing	2	1,039,175	999
NA	Environmental Quality & Housing	5	5,849	972
457	Explosives Manufacturing	5	21,980,426	785
NA	General Building Contractors	1	41,817	645
412	CAFO	1	10,812,796	617
NA	Justice, Public Order, & Safety	9	1,351,009	505
NA	Educational Services	5	4,934,978	410
426	Glass Manufacturing	3	2,715,981	353
NA	Special Trade Contractors	1	8,073,573	330
NA	Construction And Development	2	28,460,736	324
NA	Lumber & Wood Products	1	8,975,046	283
NA	Airport Deicing	5	1,162,405	265
435	Oil & Gas Extraction	5	531,118	256
NA	Real Estate	9	4,857,073	214
465	Coil Coating	1	445	166
NA	Executive, Legislative, & General	2	53,109	77
405	Dairy products processing	3	262,241	76
NA	Trucking & Warehousing	2	83,278	58
NA	Wholesale Trade- Durable Goods	2	538,559	30
460	Hospital	2	9,134	15
NA	Pipelines, Except Natural Gas	1	289,497	12
466	Porcelain Enameling	1	13,507	11
425	Leather Tanning And Finishing	1	33,076	8
451	Concentrated Aquatic Animal Production	23	5,310,357	5
438	Metal Products And Machinery	2	1,187,703	3
NA	Tobacco Products	1	10,740	3
4959	Sanitary Services	2	653,114	3
NA	Transportation Services	1	713,322	3

Table 3-22. DMR 2007 Point Source Category Rankings by TWPE

40 CFR Part	Point Source Category	Number of Facilities	Total Pounds	Total TWPE
NA	Photo Processing	1	34,136	1
459	Photographic	1	34,136	1
442	Transportation Equipment Cleaning	2	326,427	0
NA	Wholesale Trade- Nondurable Goods	1	33,166	0

Source: *DMRLoads2007_v3*.

^a414.1 refers to the chlorinated hydrocarbon segment of the Organic Chemicals, Plastics, and Synthetic Fibers Category (40 CFR Part) 414 and the Chlor-Alkali Subcategory of the Inorganic Chemicals Manufacturing Category (40 CFR Part 415).

NA – Not applicable; no existing ELGs apply to discharges.

- **Load Calculator routines.** EPA’s quality review for the Load Calculator routines included accuracy checks for database queries on *PCSLoadCalculator2007*. EPA reviewed the programming code used to develop each query to verify the logic and verified that the number of records in the output table equaled the number of records in intermediate queries to ensure that no data were missing and that there were no duplicate data. EPA also verified the Load Calculator routine in the ICIS-NPDES Pollutant Loading Tool. EPA created a query-based system and compared the annual loads calculated by the queries to those calculated by the ICIS-NPDES Pollutant Loading Tool. The output from the queries was identical to that of the ICIS-NPDES Pollutant Loading Tool. In addition, EPA performed hand calculations to verify the accuracy of the *PCSLoadCalculator2007* and ICIS-NPDES Load Calculator Module outputs during reviews of facility discharges for *DMRLoads2007* results.
- **DMRLoads2007 results.** EPA’s quality review of the *DMRLoads2007* results included the following:
 - *Completeness checks:* EPA compared counts of dischargers in *DMRLoads2007* to *PCSLoads2004* to describe the completeness of the database. There were 2,027 facilities that reported a load to *PCSLoads2004* and 2,018 facilities that reported a load to *DMRLoads2007*. Therefore, EPA determined *DMRLoads2007* was complete.
 - *Accuracy of facility discharges.* EPA reviewed the accuracy of facilities’ discharges that had the greatest impact on total category loads and category rankings to identify possible calculation errors. EPA reviewed monthly information reported in PCS and ICIS-NPDES, measurement data available on EPA’s Envirofacts Web page, and information from the facility’s NPDES permit. In some cases, EPA contacted facilities to verify the monthly measurements in their DMR. Section 3.4.2 describes EPA’s review of facility discharges in more detail.
 - *Accuracy of category discharges.* EPA reviewed the accuracy of category discharges by verifying that pollutant discharges in PCS and ICIS-NPDES

were assigned to the appropriate point source category. EPA used engineering judgment to determine if the pollutant discharge was reasonably associated with the point source category. Section 3.2.7 discusses facility-level and pollutant-level category assignments.

- *Accuracy of database queries.* EPA's quality review for the development of *DMRLoads2007* included accuracy checks for database queries in *DMRLoadsAnalysis2007*, *DMRNutrients2007*, and *DMRLoads2007*. Documentation of accuracy checks is provided in a QC table in each Microsoft Access™ database.
- *Reasonableness of pollutant loads.* EPA reviewed the Load Calculator output (i.e., the calculated kg/year for each pollutant at each discharge pipe and monitoring location) for those pollutant discharges with the highest toxic-weighted loads (e.g., dioxins, PCBs, and mercury). To identify possible errors in recording units of measure, EPA identified calculated discharges that were orders of magnitude higher than previous years' discharges and other facilities within the same category. EPA reviewed quantities or concentrations and flows that the *PCSLoadCalculator2007* and ICIS-NPDES Pollutant Loading Tool databases used to calculate the annual discharge. EPA compared these measurements with measurements available on EPA's Envirofacts web page. If the measurements were similar then EPA concluded that the output was acceptable. If the data did not match between the databases and Envirofacts, EPA corrected the data to match Envirofacts. When EPA was unsure of the correct data, EPA contacted the facility for more information (see Section 3.4.2).
- *Reasonableness of facility loads.* EPA identified facility discharges with the highest TWPE and nutrient pollutant loads. EPA identified facilities for review whose pollutant discharges accounted for more than 95 percent of the TWPE for its point source category. Similarly, EPA identified facilities for review whose nitrogen and phosphorus discharges account for the majority of nutrient discharges in *DMRLoads2007*. EPA compared 2007 PCS and ICIS-NPDES data to other available information, such as information from EPA's Envirofacts web page, the facility's NPDES permit, and discussion with the facility contact. EPA made several facility-level corrections, as shown in Table 3-23.
- *Comparability.* EPA compared *DMRLoads2007* to *PCSLoads2004* and *PCSLoads2002* to identify pollutant discharges or wastewater flows that differ more than the year-to-year variation of other chemicals and facilities. EPA used this comparison to determine if quantity, concentration, or flow corrections were needed for facility discharges with the highest TWPE. If the comparison was unavailable (e.g., the pollutant was not previously reported) EPA contacted the facility (see Table 3-23).

The following sections discuss EPA's quality review for the development of *DMRLoads2007*:

- Section 3.4.1 describes EPA's review of mercury using PRAM 50092 (Mercury Total Low Level); and
- Section 3.4.2 describes EPA's facility review.

3.4.1 Mercury Discharges Reported Using PRAM 50092

During the reasonableness checks of the PCS CNVRT output, EPA identified unusually high mercury concentrations reported to PCS by facilities located in Ohio in the PCS CNVT output. These facilities reported mercury discharges using PRAM 50092 (Mercury Total Low Level). The PRAM 50092 concentrations in the 2004 CNVRT output ranged from 0.2 to 673 mg/L and from 0.0035 to 260,000 mg/L in the 2007 CNVRT output. EPA contacted the Ohio Environmental Protection Agency (Ohio EPA) to determine the correct reporting units for PRAM 50092 (Finseth, 2007c). An Ohio EPA representative explained that Ohio EPA started requiring low level mercury analyses in 2002. At that time, some facilities had limits in micrograms per liter (µg/L). Currently, all of the limits are in nanograms per liter (ng/L).

As a result of this contact, EPA concluded that the units for the PRAM 50092 concentrations for the 2004 PCS data should be ng/L, not mg/L. The PRAM 50092 concentrations in the 2007 CNVRT output ranged from 0.0035 to 260,000 mg/L with greater than 99 percent of these concentrations between 0.5 and 800 mg/L. Based on this distribution, EPA concluded that the error for the 2004 data persisted in 2007. Therefore, EPA corrected the concentrations by dividing all concentrations for PRAM 50092 reported by facilities in Ohio in *PCSLoadCalculator2007* by one million. EPA did not make any corrections to the ICIS-NPDES Pollutant Loading Tool because Ohio 2007 DMR data are only in PCS.

3.4.2 Facility Reviews

EPA reviewed the accuracy of facility discharges that had the greatest impact on total category loads and category rankings. EPA used the following criteria to select facilities for review:

- Facilities with the highest toxic-weighted discharges of individual pollutant parameters;
- Facilities with the highest discharges of nutrients; and
- Facilities with relatively high percent of their discharges based on estimates for missing DMR data (EST).

For the identified facilities, EPA used the following steps to review the accuracy of the loads calculated from PCS and ICIS-NPDES data.

1. Reviewed database corrections for *PCSLoads2004*, *PCSLoads2002*, and *PCSLoads2000* to determine whether corrections were made during previous reviews and evaluated whether these corrections should be applied to the 2007 DMR discharges.

2. Reviewed 2007 DMR data, hand calculated annual pollutant loads, and compared results to loads calculated by *PCSLoadCalculator2007* and the ICIS-NPDES Pollutant Loading tool, and stored in *DMRLoads2007*.
3. Reviewed PCS and ICIS-NPDES pipe description information available in PCS, EPA's on-line Envirofacts data system, ICIS-NPDES supporting tables, or from the facility's NPDES permit to identify monitored pollutant discharges that are:
 - a. Intermittent (e.g., tidal, seasonal, or occur after a storm event)
 - b. Internal monitoring locations from which wastewater is combined with other waste streams and monitored again, resulting in double counting loads, and
 - c. Not representative of category discharges (e.g., storm water runoff from non-process areas, non-contact cooling water, or wastewater related to operations in another point source category).

Table 3-23 presents EPA's review of facilities in *DMRLoads2007* and the resulting corrections made to the database.

Table 3-23. Summary of DMRLoads2007 Facility Review

Facility	Location	Point Source Category	Pollutant(s) in Question	Review Findings	Action Taken/ Database Correction
Blue Heron Paper Company	Oregon City, OR	Pulp and Paperboard	Methylmercury	Methylmercury concentrations in <i>PCSLoadCalculator2007</i> are 1,000 times higher than the concentrations in Envirofacts. Envirofacts methylmercury concentrations are in ng/L but were entered into <i>PCSLoadCalculator2007</i> as µg/L. Facility contact verified units should be ng/L (McCuutchen, 2009).	Database Change: Correct methylmercury concentrations
Cargill Fertilizer, Inc. – Riv	Hillsborough County, FL	Phosphate Manufacturing	Phosphorous	Facility reports DRID 1 (monthly conc.) and A (annual quan.) with annual loads that do not equal. DMR is counting both DRIDs instead of just one also. Unable to determine the correct DRID to use based on Envirofacts.	None
CF Industries – Donaldsonville	Donaldsonville, LA	Fertilizer Manufacturing	Nitrogen, Ammonia	Maximum quantities are less than average quantities. Suspect that some average quantities should be divided by 10. Envirofacts has the same quantities.	None
Clean Harbors White Castle LLC	Iberville Parish, LA	CWT	Benzidine	The permitted benzidine limit is three orders of magnitude lower than the concentrations in <i>PCSLoadCalculator2007</i> . Facility contact said that benzidine was ND (Ourso, 2009).	Database Change: Revise benzidine concentrations to zero
Climax Mine	Summit County, CO	Ore Mining and Dressing	Molybdenum	This is a molybdenum mine. Units are consistent with Envirofacts and permit reporting limits. Permit/fact sheet contains self-monitoring data that agrees with the values reported to PCS (CO DH, 2004; CO DPHE, 2004).	None
Doe Run Resources Co	Viburnum, MO	Ore Mining and Dressing	Lead	This is a lead or zinc mine based on SIC code. Units are consistent with Envirofacts and permit reporting limits (0.005 mg/L to 0.8 mg/L).	None

Table 3-23. Summary of DMRLoads2007 Facility Review

Facility	Location	Point Source Category	Pollutant(s) in Question	Review Findings	Action Taken/ Database Correction
Dyno Nobel, Inc.	Carthage, MO	Explosives Manufacturing	Nitrogen, Ammonia	For pram 00610 (Nitrogen, ammonia total (as N)), each outfall reports 6 months under DRID B and 6 months under DRID C. Flows for some months are 1,000 times greater than other months.	Database Change: Change DRID B and D to C for PRAM 00610 and divide affected flows by 1,000.
Envirosystems Incorporated	Hampton, NH	Independent And Stand Alone Labs	Cadmium	Review of fact sheet shows that facility incorrectly reported flows in GPD instead of MGD for certain months (U.S. EPA Region 1, 2006).	Database Change: Correct flows for the affected monitoring periods
Front St. Remedial Action	Kansas City, MO	Waste Combustors	Dioxin	Facility is a superfund site, and operated in the past as both a waste combustor and CWT. Currently treating groundwater contaminated by organics and inorganics. Three of four dioxin concentrations in 2007 were above the detection limit and the MDL. Concentrations were provided by permitting authority. Detected dioxin in Q2 2007 and Q3 and Q4 were ND. Lab did not analyze wastewater for dioxin for Q1 (Archterlonie, 2009).	Database Change: Revise SIC code to link to superfund category
GE Silicones, LLC	Friendly, WV	OCPSF	Copper	Suspected copper concentrations units error because the permit reporting requirements are in µg/L instead of mg/L. Facility confirmed the units error and provided correct concentrations for two quarters. Data was reported as µg/L not mg/L (Martin, 2009a).	Future Database Change: Revise copper concentrations
General Electric – Erie	Erie, PA	Metal Finishing	Mercury	Facility reported 3.3 mg/L in December 2007, reported annually. Verified units in OTIS. Facility said mercury should be ng/L instead of mg/L (Verderese, 2009).	Future Database Change: Revise mercury concentration
Golden Eagle Refinery	Martinez, CA	Petroleum refining	TCDD Equivalents	TCDD Equivalents measurements in database are 1,000 times larger than the concentrations in Envirofacts. The units for concentrations in Envirofacts are in pg/L.	Database Change: Correct TCDD Equivalents measurements

Table 3-23. Summary of DMRLoads2007 Facility Review

Facility	Location	Point Source Category	Pollutant(s) in Question	Review Findings	Action Taken/ Database Correction
IMC – Phosphates Company	Donaldsonville, LA	Fertilizer Manufacturing	Phosphorous	Highest phosphorous loads are from outfall 002. Loads are approximately the same using the quantity and the concentration calculations. Loads also are comparable to <i>PCSLoads2004</i> .	None
Innovia Films	Tecumseh, KS	Plastics Molding and Forming	Carbon Disulfide	One monthly concentration appears to be 100 times higher than the other months in 2007 and 2004. Facility contact provided corrected concentrations for April and May that were units errors (Martin, 2009b).	Database Change: Correct carbon disulfide concentrations
Jackson County	Pascagoula, MS	Fertilizer Manufacturing	Phosphorous	Concentrations in Envirofacts match concentrations in <i>PCSLoadCalculator2007</i> .	None
LAC Minerals	Central City, SD	Ore Mining	Cyanide	A review of the permit and fact sheet indicated that the outfall STR is an in-stream monitoring location and therefore should be excluded from the facility's loads (Fuller, 2005).	Database Change: Change MLOC to Z (excluded from database) outfall STR
Morgan's Point Plant	Morgan's Point, TX	OCPSF	Chlorine	The monthly average flow for March 2007 was 10,000 times higher than the monthly maximum flow for that month and the flows for the rest of the year.	Database Change: Correct March 2007 flow
Northshore Mining/Silver Bay P	Silver Bay, MN	Ore Mining and Dressing	Copper	This is a taconite mine. Units are consistent with Envirofacts and permit reporting limits. The calculation relies on only one reported measurement when the permit shows facility must monitor monthly.	None
PEPCO-Benning	Washington, DC	Steam Electric Power Generation	Arochlor 1260	A review of OTIS data shows that all PCBs were reported as BDL with "<" and a concentration. The data in ICIS-NPDES did not include the less-than signs. Because all monthly values are BDL, using the Hybrid Method all PCB loads should be zero.	Database Change: Zero all PCB (PRAM codes 39508, 39504, and 39496) loads

Table 3-23. Summary of DMRLoads2007 Facility Review

Facility	Location	Point Source Category	Pollutant(s) in Question	Review Findings	Action Taken/ Database Correction
Prasa El Yunque Filtration Plant	Rio Grande, PR	Drinking Water Treatment	Copper	Review of the 2007 concentration data in OTIS indicated that February through August, November, and December copper concentrations were reported in µg/L but were in the ICIS-NPDES database as mg/L.	Database Change: Revise affected copper concentrations by 1,000
Rhone-Poulenc Basic Chemicals	Baton Rouge, LA	Inorganic chemicals manufacturing	Phosphorus, Total (as P)	A review of the facility's discharges and Envirofacts data shows the phosphorous concentrations should be in pg/L rather than µg/L.	Database Change: Revise Phosphorus, Total (As P) concentrations
Sabic Innovate Plastics	Ottawa, IL	OCPSP	Hexachlorobenzene	Review of concentration data for OTIS showed that the data were missing '<' signs for every month reported for all parameters except for copper.	Database Change: Zero all loads except for copper
SIGECO FB Cully Station	Newburgh, IN	Steam Electric Power Generation	Aluminum	For aluminum, the concentration for 10 months is 1,000 times higher than the Form 2C data (2006) and 2006/2008 data in OTIS. Silver, arsenic, and cadmium concentrations are suspected units error based on the Form 2C data. Corrected concentrations to correspond to Form 2C data (SIGECO, 1994).	Database Change: Revise metal concentrations
Tampa Bay Desal	Tampa Bay, FL	Drinking Water Treatment	Chloride	Previous review identified a mismatch between flows and concentrations. NPDES permit fact sheet indicated the flow is diluted by 70 percent from the plant outfall to the final outfall (State of Florida, 2001).	Database Change: Divide monthly flows by 70
Tosco Refinery (Rodeo)	Rodeo, CA	Petroleum refining	TCDD Equivalents	TCDD equivalents measurements in database are 1,000 times larger than the concentrations in Envirofacts. The units for concentrations in Envirofacts are in pg/L.	Database Change: Revise TCDD equivalents concentrations
USA Holston Army Ammo Plant Area	Kingsport, TN	Explosives Manufacturing	RDX, Total	Facility contact said the December 2007 value was RDX, Total production instead of effluent concentration. Contact provided correct concentration (House, 2009).	Database Change: Revise RDX, Total December 2007 concentration

Table 3-23. Summary of DMRLoads2007 Facility Review

Facility	Location	Point Source Category	Pollutant(s) in Question	Review Findings	Action Taken/ Database Correction
Westvaco Texas, L.P.	Evadale, TX	Pulp, paper and paperboard	TCDD Equivalents	Concentrations in <i>PCSLoadCalculator2007</i> are 1,000 times larger than the concentrations in Envirofacts. The units for concentrations in Envirofacts are in pg/L. Facility contact also said all quarters were ND, even though the fourth quarter did not have a '<' indicator (Davis, 2009).	Database Change: Revise TCDD equivalents concentrations Future Database Change: Add < indicator to fourth quarter 2007 TCDD equivalents concentration
Wise Alloys LLC	Muscle Shoals, AL	Aluminum Forming	Nitrogen, Nitrate Total (as N)	The facility reported two DRIDs: 1 (monthly concs.) and Q (quarterly quan.). Unable to determine the difference between DRIDs. Envirofacts does not have the permit/fact sheet.	None

3.5 DMRLoads2007 References

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4. IDENTIFICATION OF POINT SOURCE CATEGORIES

The purpose of EPA's screening-level analysis is to use existing environmental data reported in discharge monitoring reports (DMRs) and in the Toxics Release Inventory (TRI) to investigate discharges from industrial point source categories and prioritize these categories for additional review. Specifically, EPA prioritizes its review of the industrial categories currently regulated by existing effluent limitations guidelines and standards (ELGs) that cumulatively compose 95 percent of the reported hazard (reported in units of toxic-weighted pound equivalent or TWPE). EPA focuses its efforts on collecting and analyzing data to identify industrial categories whose pollutant discharges potentially pose the greatest hazard to human health or the environment because of their toxicity (i.e., highest estimates of toxic-weighted pollutant discharges).

The term "point source category" refers to an industry as a whole based on similarity of product produced or service provided, and is not meant to refer to specific industrial activities or processes involved in generating the product or service. EPA therefore identifies in its biennial Effluent Guidelines Program Plan only those new industries that it determines are properly considered stand-alone "categories" within the meaning of the CWA – not those that are properly considered potential new subcategories of existing categories based on similarity of product or service. As part of existing effluent guidelines and pretreatment standard annual reviews, EPA considers whether there are industrial activities not currently subject to effluent guidelines or pretreatment standards that should be included with these existing categories, either as part of existing subcategories or as potential new subcategories.

Pursuant to CWA section 304(b), which requires EPA to establish ELGs for "classes and categories of point sources," EPA has promulgated ELGs for 56 industrial "categories." Each of these "categories" consists of a broad array of facilities that produce a similar product or perform a similar service – and is broken down into smaller subsets, termed "subcategories," that reflect variations in the processes, treatment technologies, costs and other factors associated with the production of that product that EPA is required to consider in establishing ELGs under section 304(b).

For example, the Pulp, Paper and Paperboard Point Source Category (40 CFR Part 430) encompasses a diverse range of industrial facilities involved in the manufacture of a like product (paper); the facilities range from mills that produce the raw material (pulp) to facilities that manufacture end-products such as newsprint or tissue paper. EPA's classification of this "industry by major production processes used many of the statutory factors set forth in CWA Section 304(b), including manufacturing processes and equipment (e.g., chemical, mechanical, and secondary fiber pulping; pulp bleaching; paper making); raw materials (e.g., wood, secondary fiber, non-wood fiber, purchased pulp); products manufactured (e.g., unbleached pulp, bleached pulp, finished paper products); and, to a large extent, untreated and treated wastewater characteristics (e.g., BOD loadings, presence of toxic chlorinated compounds from pulp bleaching) and process water usage and discharge rates."¹⁸

Each subcategory reflects differences in the pollutant discharges and treatment technologies associated with each process. Similarly, the Iron and Steel Manufacturing Point

¹⁸ Supplemental Technical Development Document for Effluent Limitations Guidelines and Standards for the Pulp, Paper, and Paperboard Category, Page 5-3, EPA-821-R-97-011, October 1997 (U.S. EPA, 1997).

Source Category (40 CFR Part 420) consists of various subcategories that reflect the diverse range of processes involved in the manufacture of iron and steel, ranging from facilities that make the basic fuel used in the smelting of iron ore (Subpart A – Cokemaking) to those that cast the molten steel into molds to form steel products (Subpart F – Continuous Casting). An example of an industry category based on similarity of service provided is the Transportation Equipment Cleaning Point Source Category (40 CFR Part 442), which is subcategorized based on the type of tank (e.g., rail cars, trucks, barges) or cargo transported by the tanks cleaned by these facilities, reflecting variations in wastewaters and treatment technologies associated with each.

Finally, Section 304(m)(1)(B) of the CWA directs EPA to use the biennial Effluent Guidelines Program Plans to identify categories of sources discharging non-trivial amounts of toxic or non-conventional pollutants for which EPA has not published ELGs under section 304(b)(2) or new source performance standards (NSPS) under section 306. EPA uses DMR and TRI data to assist in the identification of any new point source categories that meet the criteria of Section 304(m)(1)(B). EPA also uses TRI data to help identify indirect dischargers without categorical pretreatment standards to identify potential new categories for pretreatment standards under CWA Sections 304(g) and 307(b). EPA assesses whether industrial operations not currently regulated by existing effluent guidelines or pretreatment standards should be addressed as a potential new subcategory under an existing point source category rather than as a new industrial category.

EPA uses Standard Industrial Classification (SIC) and North American Industrial Classification System (NAICS) codes to relate discharge data in DMR and TRI to the point source categories. DMR data are contained in EPA's Permit Compliance System (PCS) and the Integrated Compliance Information System for the National Pollutant Discharge Elimination System (ICIS-NPDES). As part of the 2009 annual review, EPA created *DMRLoads2007* to combine DMR data from PCS and ICIS-NPDES (see Section 3). Facilities with data in PCS and/or ICIS-NPDES are identified by a four-digit SIC code, while facilities with data in TRI are identified by a six-digit NAICS code. To use the DMR and TRI data to estimate the pollutants discharged by each industrial point source category, EPA linked each four-digit SIC code and six-digit NAICS code to an appropriate point source category. EPA's linkages are summarized in the "SIC/Point Source Category Crosswalk" and "NAICS/Point Source Category Crosswalk" tables (Tables C-1 and C-2 in Appendix C, respectively). These crosswalks are key elements of both the *DMRLoads2007* and *TRIReleases2007* databases.

The remainder of this section presents the following information:

- Section 4.1 – Background on NAICS and SIC Codes;
- Section 4.2 – SIC Code to Point Source Category Crosswalk;
- Section 4.3 – NAICS Code to Point Source Category Crosswalk;
- Section 4.4 – Potential New Point Source Categories; and
- Section 4.5 – Crosswalk References.

4.1 Background on NAICS and SIC Codes

Starting in 2006, facilities reporting to EPA's TRI were required to provide the NAICS code(s) that describe their actions. The NAICS system is the current statistical classification standard underlying all establishment-based federal economic statistics classified by industry (U.S. Census Bureau, 2009). The Office of Management and Budget (OMB) first developed the

NAICS system in 1997 to replace SIC codes and streamline economic statistics throughout North America. The first set of NAICS codes were updated in 2002 (referred to as the 2002 NAICS system), and the second set were updated in 2007 (referred to as the 2007 NAICS system).

Although it was developed by OMB, the NAICS system is used by other government agencies, including EPA, to promote data comparability. In the NAICS system, each establishment is classified according to its primary economic activity, which is determined by its principal product or group of products. An establishment may have activities in more than one NAICS code. Some data collection organizations (e.g., the U.S. Economic Census) assign one NAICS code per establishment.

On June 6, 2006, EPA published a final rule requiring facilities to use 2002 NAICS codes, instead of SIC codes, for reporting to the 2006 and 2007 TRI (see 71 FRN 32464). EPA is requiring facilities to use 2007 NAICS codes for reporting to the 2008 TRI and future years (see 73 FRN 32466, June 9, 2008). TRI allows facilities to identify their primary NAICS code and up to five additional NAICS codes. These codes reflect the principal activity causing environmental releases at a facility and other activities, respectively.

Facilities with data in PCS and ICIS-NPDES are classified by SIC code. EPA has not announced plans to change its PCS and ICIS-NPDES databases to NAICS codes. As with the NAICS system, an establishment may have activities in more than one SIC code (OMB, 1987). PCS allows facilities to report one SIC code, while ICIS-NPDES allows facilities to report a primary SIC code and up to two additional SIC codes. The primary SIC code reflects the principal activity causing the discharge at each facility and the additional SIC codes represent other activities at the facility.

As part of the 2009 annual review, EPA reviewed its existing SIC/Point Source Category Crosswalk to determine if revisions were necessary because facilities reported new SIC codes or additional information about their discharges. Because the TRI data for 2007 is classified by NAICS code, EPA created a NAICS/Point Source Category Crosswalk for *TRIRelleases2007*. For a given facility, the operations covered by the SIC code in PCS and/or ICIS-NPDES may differ from operations covered by the primary NAICS code identified in TRI.

4.2 SIC Code to Point Source Category Crosswalk

EPA first developed the SIC code to point source category crosswalk (SIC/Point Source Category Crosswalk) as part of the 2003 and 2004 screening-level analyses (U.S. EPA, 2005a). Since then, EPA has continued to update this crosswalk. Specifically for the 2009 screening-level review, EPA updated this crosswalk for use with *DMRLoads2007*. For the 2009 annual review, as well as previous reviews, EPA divided the SIC codes into four groups defined as follows:

- **Existing Point Source Category.** Discharges from most facilities in the SIC code meet the applicability requirements of an existing point source category.
- **Potential New Subcategory of an Existing Point Source Category.** Discharges from most facilities in the SIC code may be considered part of a potential new subcategory of an industrial category subject to an existing ELG. EPA based this

determination on the similarity of processes and operations at facilities in the SIC code to those at facilities in the existing category.

- **Potential New Point Source Category.** Discharges from facilities in the SIC code are similar to each other but do not meet the applicability requirements of and are not similar to a point source category subject to an existing ELG.
- **Category Not Identifiable.** Facilities in the SIC code engage in a variety of industrial operations and likely meet the applicability requirements of several existing point source categories. However, EPA is not able to identify a coherent stand-alone point source category based on the SIC code description.

Most SIC codes reported by facilities with DMR discharge information meet the applicability of an existing point source category and fall into the first group. The following sections describe the development and review of the SIC/Point Source Category Crosswalk.

4.2.1 SIC Codes Related to Existing Point Source Categories

As part of its 2003 and 2004 screening-level analyses, EPA related SIC codes to existing point source categories. During the development of the existing ELGs for these categories, EPA studied demographic and economic data, including SIC code data, for the facilities to which the ELGs apply. EPA developed the relationship, or “crosswalk,” between SIC codes and point source categories by consulting, as necessary, the documentation for the development on the existing ELGs. This crosswalk is included as Table C-1 in Appendix C.

Because most point source categories are not defined by SIC code, the relationship between SIC code and point source category is not a one-to-one correlation. A single SIC code may include facilities in more than one point source category, so associating an SIC code with only one category may be an over simplification. Also, many facilities have operations subject to more than one point source category. Further, facilities in some categories cannot be identified by SIC code. The following subsections discuss how EPA reconciled these inconsistencies to cross-reference appropriate point source categories to specific SIC codes. EPA reviewed each of these inconsistencies as part of the 2009 annual review and further refined the SIC/Point Source Category Crosswalk.

4.2.1.1 SIC Codes Counted in More than One Point Source Category

A single SIC code may include facilities subject to more than one point source category. For example, SIC code 3357, Drawing and Insulating of Nonferrous Wire, includes facilities that draw wire made from aluminum, copper, and other nonferrous metals such as nickel and silver. Depending on the type of metal, ELGs from three categories may apply to the discharges from these operations. EPA included the loads discharged by facilities in SIC code 3357 in each of the three applicable categories: Aluminum Forming, Copper Forming, and Nonferrous Metals Forming. In order to make a “worst case” estimate of the TWPE discharged by every category, EPA included the loads from SIC codes associated with multiple point source categories in the load for each associated category, double- or triple-counting the loads from these SIC codes. Table 4-1 presents the SIC codes associated with multiple point source categories, and identifies the applicable point source categories.

Table 4-1. SIC Codes Counted in Multiple Point Source Categories

SIC Code	SIC Description	Applicable Point Source Categories
3357	Drawing and Insulating of Nonferrous Wire	Aluminum Forming (40 CFR 467), Copper Forming (40 CFR 468), and Nonferrous Metals Forming & Metal Powders (40 CFR 471)
3363	Aluminum Die Casting	Aluminum Forming (40 CFR 467) and Nonferrous Metals Forming & Metal Powders (40 CFR 471)
3482	Small Arms Ammunition	Metal Finishing (40 CFR 433) and Nonferrous Metals Forming & Metal Powders (40 CFR 471)
3483	Ammunition, Except for Small Arms	Metal Finishing (40 CFR 433) and Nonferrous Metals Forming & Metal Powders (40 CFR 471)
3463	Nonferrous Forgings	Aluminum Forming (40 CFR 467), Copper Forming (40 CFR 468), and Nonferrous Metals Forming & Metal Powders (40 CFR 471)
4953	Refuse Systems	Landfills (40 CFR 445) and Waste Combustors (40 CFR 444)
7221	Photographic Studios, Portrait	Photographic (40 CFR 459) and Photoprocessing (2005 Annual Review Potential New Subcategory) ^a
7335	Commercial Photography	Photographic (40 CFR 459) and Photoprocessing (2005 Annual Review Potential New Subcategory) ^a
7336	Commercial Art and Graphic Design	Photographic (40 CFR 459) and Photoprocessing (2005 Annual Review Potential New Subcategory) ^a
7384	Photofinishing Laboratories	Photographic (40 CFR 459) and Photoprocessing (2005 Annual Review Potential New Subcategory) ^a

^a As part of the Final 2006 Plan, EPA determined that categorical pretreatment standards were not warranted for the Photoprocessing industry (U.S. EPA, 2006b).

4.2.1.2 SIC Codes Divided Among Point Source Categories

As noted previously, some facilities are subject to regulations from more than one point source category. EPA was able to assign discharges from some of these SIC codes to the appropriate category and avoid double counting. EPA made some of these assignments at the facility level and some at the pollutant level, as discussed below.

Facility-Level Point Source Category Assignment

For some SIC codes with facilities subject to more than one point source category, EPA was able to assign each facility to a category. EPA reviewed information available about each facility to determine which point source category applied to the facility's operations. As part of the 2005 and 2006 annual reviews, EPA contacted facilities to understand which facility operations were the source of reported wastewater discharges if publically available information did not indicate the appropriate category. For example, for the 2005 annual review, EPA located information about facilities in SIC codes associated with both the Porcelain Enameling and Metal Finishing Categories. EPA used this information to determine the category most likely to

apply to each facility's discharge (Wolford, 2005). As part of the 2009 screening-level review, EPA updated the SIC/Point Source Category Crosswalk based on this review (see Section 4.2.1.2). Facilities reporting these SIC codes for the first time in 2007 (e.g., previously reported a different SIC code or are new facilities) were reviewed to link the facility's discharges to the appropriate point source category as part of the 2009 annual review. Table 4-2 presents the SIC codes that EPA assigned to point source categories at the facility level. In future databases, as new facilities report SIC codes that do not link directly to a point source category (e.g., SIC code 2048 does not link to a point source category), EPA will review facility's operations and identify the appropriate point source category. EPA will also review operations of new facilities with significant TWPE in each of these SIC codes to determine if they are assigned to the appropriate point source category.

As part of the 2009 screening-level review, EPA reviewed available information about pollutant loads and facility information for facilities reporting SIC code 4953, Refuse Systems, to determine if the facility's discharges were primarily associated with operations regulated by the Landfill Category (40 CFR Part 444) or by the Waste Combustor Category (40 CFR Part 445). EPA incorporated these changes into the SIC/Point Source Category Crosswalk in the 2007 DMR database based on this review (see Section 4.2.1.2). In future databases, as new facilities report SIC code 4953, EPA will individually review their operations to determine the category that most likely applies to the facility's discharges.

Table 4-2. Facility-Level Point Source Category Assignment SIC Codes

SIC	Primary Associated Point Source Category	Other Associated Point Source Categories	Expanded SIC Code (Assigned at Facility Level)
2048: Prepared Feed and Feed Ingredients for Animals and Fowl, Except Dogs and Cats	None. In future databases as new facilities report this SIC code, EPA will review facility's operations and identify the appropriate point source category.	Grain Mills Manufacturing (40 CFR Part 406)	2048GRAIN
		Meat and Poultry Products (40 CFR Part 432)	2048MPP
		Pharmaceutical Manufacturing (40 CFR Part 439)	2048PH
2819: Industrial Inorganic Chemicals, NEC	Inorganic Chemicals Manufacturing (40 CFR Part 415)	Nonferrous Metals Manufacturing (40 CFR Part 471)	2819NMM
		Phosphate Manufacturing (40 CFR Part 422)	2819PHOS
2874: Phosphatic Fertilizers	Phosphate Manufacturing (40 CFR Part 422)	Fertilizer Manufacturing (40 CFR Part 418)	2874FER
3341: Secondary Smelting and Refining of Nonferrous Metals	Nonferrous Metals Manufacturing (40 CFR Part 421)	Coil Coating (40 CFR Part 465)	3341CC
3431: Metal Sanitary Ware	Metal Finishing (40 CFR Part 433)	Porcelain Enameling (40 CFR Part 467)	3431PE
3469: Metal Stampings, NEC	Metal Finishing (40 CFR Part 433)	Porcelain Enameling (40 CFR Part 467)	3469PE
3471: Plating and Polishing	Metal Finishing (40 CFR Part 433)	Coil Coating (40 CFR Part 465)	3471CC

Table 4-2. Facility-Level Point Source Category Assignment SIC Codes

SIC	Primary Associated Point Source Category	Other Associated Point Source Categories	Expanded SIC Code (Assigned at Facility Level)
3624: Carbon and Graphite Products	Metal Finishing (40 CFR Part 433)	Carbon Black Manufacturing (40 CFR Part 458)	3624CB
3633: Household Laundry Equipment	Metal Finishing (40 CFR Part 433)	Porcelain Enameling (40 CFR Part 467)	3633PE
3639: Household Appliances, NEC	Metal Finishing (40 CFR Part 433)	Porcelain Enameling (40 CFR Part 467)	3639PE
4953: Refuse Systems	Landfills (40 CFR 445) and Waste Combustors (40 CFR 444) ^a	Landfills (40 CFR Part 445)	4953L
		Waste Combustors (40 CFR Part 444)	4953WC

NEC – Not elsewhere classified.

^a In future databases as new facilities report this SIC code, EPA will review facility's operations and identify the appropriate point source category.

EPA is currently considering revisions to a subset of the ELGs for Organic Chemicals, Pesticides, and Synthetic Fibers (OCPSF) (40 CFR 414) and the Inorganic Chemicals Manufacturing (40 CFR 415) for facilities that produce chlorine and chlorinated hydrocarbons (CCH). Because the CCH rulemaking is underway, for the 2009 annual review and previous reviews, EPA assigned the SIC code "VCCA" to the CCH facilities in the SIC/Point Source Category Crosswalk to separately identify these facilities (note VCCA, Vinyl Chloride and Chloralkali, is the previous name for the CCH rulemaking). The list of CCH facilities in *DMRLoads2007* is included in Table C-3 in Appendix C.

As part of the Pulp, Paper, and Paperboard Category (Pulp and Paper Category) (40 CFR Part 430) Detailed Study (U.S. EPA, 2006a), EPA reviewed the operations of facilities reporting SIC codes 2611: Pulp Mills, 2621: Paper Mills, and 2631: Paperboard Mills to determine the applicable subpart for each facility. A 1988 legal suit obligated EPA to address discharges of polychlorinated dibenzo-(p)-dioxins and polychlorinated dibenzofurans from 104 bleaching pulp mills, including nine dissolving pulp mills. During its response to the 1988 legal suit, EPA decided to review and revise the Pulp and Paper Category regulations in three phases. EPA addressed Phase I first, chose not to revise the ELGs for Phase II, and chose to support NPDES permit writers individually in developing permit-specific effluent limitations to control discharges of these chemicals from the remaining operating mills in Phase III.

Because the Pulp and Paper Category regulations regulate facilities by process used and product produced they do not correspond to SIC codes. Therefore, EPA added "-1" to the SIC codes of facilities that met the applicability of Phase I:

- Subpart B (Bleached Papergrade Kraft and Soda); and
- Subpart E (Papergrade Sulfite).

EPA added "-2" to the SIC codes of facilities that met the applicability of Phase II:

- Subpart C (Unbleached Kraft);
- Subpart F (Semi-Chemical);
- Subpart G (Groundwood, Chemic-Mechanical, and Chemic-Thermo-Mechanical);
- Subpart H (Non-Wood Chemical Pulp);
- Subpart I (Secondary Fiber Deink);
- Subpart J (Secondary Fiber Non-Deink);
- Subpart K (Fine and Lightweight Papers from Purchased Pulp); and
- Subpart L (Tissue, Filter, Non-Woven and Paperboard from Purchased Pulp).

EPA added “-3” to the SIC codes of facilities that met the applicability of Phase III:

- Subpart A (Dissolving Kraft); and
- Subpart D (Dissolving Sulfite).

As part of the 2009 annual review, EPA continued incorporating the updated SIC codes identified during previous annual reviews. EPA did not review operations for new facilities reporting the SIC codes 2611, 2621, and 2631 to assign the regulatory phase to the facilities.

Outfall-Level Point Source Category Assignment

EPA was able to divide the pollutant discharges for selected facilities that discharge wastewater subject to more than one point source category by outfall. As part of the 2007 annual review, EPA reviewed discharges, permits, and permit fact sheets for facilities with high TWPE. EPA determined that one, Radford Army Ammunition Plant in Montgomery County, VA, had selected outfall that were regulated under OCPSF Category (40 CFR Part 414) while other outfall were regulated but the Explosives Manufacturing Category (40 CFR Part 457). EPA assigned the outfalls associated with OCPSF manufacturing to the OCPSF category by appending “OCPSF” to the facility’s outfall-level SIC codes. EPA continued this assignment as part of the 2009 annual review.

Pollutant-Level Point Source Category Assignment

For most facilities that discharge wastewater subject to more than one point source category, EPA was not able to divide the pollutant discharges between applicable point source categories. The following subsections discuss two exceptions where EPA was able to assign wastewater discharges of certain chemicals to the appropriate point source category.

Organic Chemicals, Plastics, and Synthetic Fibers/Pesticides

The OCPSF ELGs (40 CFR Part 414) may apply to discharges from facilities in the following SIC codes:

- 2821: Plastics Materials, Synthetic Resins, and Nonvulcanizable Elastomers;
- 2823: Cellulosic Manmade Fibers;
- 2824: Manmade Organic Fibers, Except Cellulosic;
- 2865: Cyclic Organic Crudes and Intermediates, and Organic Dyes and Pigments; and
- 2869: Industrial Organic Chemicals, Not Elsewhere Classified.

In addition, EPA is considering including operations from the following five SIC codes as potential new subcategories of the OCPSF Category:

- 2842: Specialty Cleaning, Polishing, and Sanitation Preparations;
- 2844: Perfumes, Cosmetics, and Other Toilet Preparations;
- 2891: Adhesives and Sealants;
- 2899: Chemicals and Chemical Preparations, Not Elsewhere Classified; and
- 5169: Chemicals and Allied Products, Not Elsewhere Classified.

Some facilities in the regulated SIC codes and SIC codes of the potential new subcategory manufacture and/or formulate pesticides as well as other organic chemicals. Regulations for the Pesticide Chemicals Category (40 CFR Part 455) control discharges from pesticide operations. For the 2009 screening-level analysis of discharges from existing categories, and previous reviews, EPA subtracted all pesticide discharges from OCPSF and counted them as discharges from the Pesticides Chemicals Category, by appending a “P” to the facility’s pollutant-level SIC code (e.g., EPA revised pesticide discharges from SIC code 2869 to SIC code 2869P).

EPA used a table containing a list of pesticides and their CAS numbers to identify the pesticide releases from the OCPSF Category for both the DMR and TRI databases. In developing the list of pesticides, EPA started with the list of 272 pesticide active ingredients that was created during the most recent pesticides rulemaking. Some of the pesticides in the list of 272 active ingredients were multiple compounds, for example “2,4 D salts and esters” and “organo-tin pesticides,” and were not identified by CAS number. EPA identified individual chemicals and CAS numbers for active ingredients in these groups and added them to the pesticides list. All of the chemicals identified from the list of 272 pesticide active ingredients were included in the pesticides list, except for biphenyl and dichlorobenzene. Biphenyl and dichlorobenzene were not included because EPA determined that OCPSF facilities use these chemicals for specific manufacturing uses not related to pesticides.

EPA identified additional pesticide active ingredients by using the 1988 FIFRA and TSCA Enforcement System (FATES) Database and a list created in 2003 by the Office of Pesticide Programs (OPP). EPA combined the two lists and determined which of the pesticide active ingredients facilities reported discharging to the DMR databases in 2007. For reported discharges, EPA determined whether the pesticide active ingredient had significant non-pesticide related manufacturing uses. EPA did not add chemicals, such as acrolein, trichlorofluoromethane, silver, and sulfuric acid, whose primary use was non-pesticide-related, to the list, while EPA added chemicals whose primary purpose was pesticide-related to the list. The list of chemicals reported in the DMR and TRI databases that EPA considered pesticides for the purpose of its screening-level analysis of discharges from existing categories contains 415 chemicals.

MP&M/Metal Finishing

Regulations for the Metal Finishing Category (40 CFR Part 433) may apply to discharges from facilities in 179 SIC codes for which discharges were reported in DMR in 2007. Regulations for the Metal Products and Machinery (MP&M) Category (40 CFR Part 438) may apply to some of the pollutants directly discharged by facilities in 136 of these SIC codes. The final MP&M rule at 40 CFR Part 438.1(b) specifically excludes both metal-bearing wastewaters and wastewaters subject to other effluent guidelines (e.g., Metal Finishing). For its screening-level analysis of discharges from existing categories, EPA developed methodologies to apportion

pollutant loads between the MP&M and Metal Finishing Categories. EPA applied this methodology to the 2009 screening-level analysis and previous reviews.

The MP&M rule as promulgated regulates oil and grease (O&G) and total suspended solids (TSS) in direct discharges from certain facilities that generate oily wastewater; it does not specifically regulate any other chemicals. EPA used the list of organic “pollutants of concern” it had developed for the MP&M rule and identified 103 pollutants in the DMR databases, including O&G and TSS. For the 2009 screening-level analysis, EPA counted all discharges of these pollutants from the 136 MP&M SIC codes in *DMRLoads2007* as MP&M discharges. EPA counted discharges of all other chemicals from these facilities in the Metal Finishing Category in *DMRLoads2007*. EPA believes that the identified pollutants are those that are most likely associated with the non-metal bearing oily waste streams subject to the MP&M regulations, and that this apportionment, which avoids double counting pollutant loads, is a reasonable approach for screening-level analysis of discharges from existing categories.

Table C-4 in Appendix C lists the 88 organic “pollutants of concern” for the MP&M rule. For the 2009 Annual Review, as for previous reviews, EPA matched DMR pollutants to the list of 88 MP&M chemicals using CAS numbers and the SUPERCAS table (described in Section 3). Using the SUPERCAS table, EPA matched 104 pollutant parameters to the list of 88 organic “pollutants of concern” for the MP&M rule that are discharged by facilities in the 136 MP&M SIC codes. EPA identified these 104 pollutant parameters as “Controlled by MP&M.” Table C-5 in Appendix C presents the list of DMR parameters allocated to MP&M for the 2009 Annual Review.

4.2.1.3 Categories Not Identified By SIC Code (Centralized Waste Treaters)

The Centralized Waste Treaters (CWT) Category (40 CFR Part 437) is not linked to specific SIC codes; therefore, the SIC/Point Source Category Crosswalk does not assign any SIC codes to the CWT Category. As part of the 2008 annual review, EPA reviewed the list of CWTs developed as part of the CWT rulemaking and assigned these facilities the SIC code of “CWT” and linked it to Part 437 in the SIC/Point Source Category Crosswalk. EPA also reviewed the facilities reporting SIC code 4953, Refuse Systems, and assigned CWT facilities reporting this SIC code the SIC code of “CWT” that links to Part 437. As part of the 2009 annual review, EPA reviewed the operations of all facilities reporting SIC code 4953 that were not previously assigned the “CWT” SIC code to determine if their operations were applicable to the CWT Category, Landfills Category (40 CFR Part 444), or Waste Combustors Category (40 CFR Part 445).

4.3 NAICS Code to Point Source Category Crosswalk

The 2007 TRI data was the first reporting year that facilities were required to report NAICS codes rather than SIC codes. Therefore, as part of the 2009 screening-level analyses, EPA developed the NAICS code to point source category crosswalk (NAICS/Point Source Category Crosswalk) to link NAICS codes to appropriate point source categories for use with TRI data. EPA divided the NAICS codes into four groups, the same four groups as EPA used to develop the SIC/Point Source Category Crosswalk:

- **Existing Point Source Category.** Discharges from most facilities in the NAICS code meet the applicability requirements of an existing point source category.
- **Potential New Subcategory of an Existing Point Source Category.** Discharges from most facilities in the NAICS code may be considered part of a potential new subcategory of an industrial category subject to an existing ELG. EPA based this determination on the similarity of processes and operations at facilities in the NAICS code of concern to those at facilities in the existing category.
- **Potential New Point Source Category.** Discharges from facilities in the NAICS code are similar to each other but do not meet the applicability requirements of and are not similar to a point source category subject to an existing ELG.
- **Category Not Identifiable.** Facilities in the NAICS code engage in a variety of industrial operations and likely meet the applicability requirements of several existing point source categories. However, EPA is not able to identify a coherent stand-alone point source category based on the NAICS code description.

Most NAICS codes reported by facilities in TRI meet the applicability of an existing point source category and fall into the first group.

4.3.1 NAICS Codes Related to Existing Point Source Categories

As part of its 2009 screening-level analysis, EPA related NAICS codes to existing point source categories. EPA developed this crosswalk by using TRI facilities' point source category assignments from previous years of review. For example, for the 2005 annual review SIC code 2023 is linked to the Dairy Products Processing Category (40 CFR Part 405), shown in Table 4-3. In 2007 TRI, Dietrich's Milk Products reported its pollutant discharges were from activities in the NAICS code 311514. EPA thus assigned NAICS 311514 to the Dairy Products Processing Category in the NAICS/Point Source Category Crosswalk. Using this method, EPA assigned the point source categories to all but 46 of the NAICS codes reported in *TRIReleases2007*. These 46 NAICS codes were reported by facilities that did not report to TRI in 2005. For these, EPA assigned these NAICS codes to the appropriate point source category based on NAICS descriptions and point source category applicability. The resulting NAICS/Point Source Category Crosswalk is included as Table C-2 in Appendix C.

Table 4-3. Example NAICS/Point Source Category Crosswalk Development

Facility Name	2005 SIC Code	Point Source Category	2007 NAICS Code
Dietrich's Milk Products	2023: Condensed and Evaporated Milk	Dairy Products Processing (40 CFR Part 405)	311514: Dry, Condensed, and Evaporated Dairy Product Manufacturing

Because most point source categories are not defined by NAICS code, the relationship between NAICS code and point source category is not a one-to-one correlation. This is also the case for the SIC codes (see Section 4.2.1.1). A single NAICS code may include facilities in more than one point source category, and associating a NAICS code with only one category may be an over simplification. Also, many facilities have operations subject to more than one point source

category. Further, some categories cannot be identified by NAICS code. The following subsections discuss how EPA reconciled these inconsistencies to cross-reference appropriate point source categories to specific NAICS codes. As part of previous annual reviews, EPA remedied some of these issues in the TRI databases. EPA carried these fixes over to the 2007 TRI database as part of the 2009 annual review.

4.3.1.1 NAICS Codes Counted in More than One Point Source Category

A single NAICS code may include facilities subject to more than one point source category. For example, NAICS code 562211, Hazardous Waste Treatment and Disposal, includes facilities that operate treatment and/or disposal facilities for hazardous waste. Depending on the type of treatment and/or disposal, ELGs from three different categories may apply to the discharges from these operations. EPA included the loads discharged by facilities in NAICS code 562211 in each of the three applicable categories: Centralized Waste Treatment, Waste Combustors, and Landfills. In order to make a “worst case” estimate of the TWPE discharged by every category, EPA included the loads from NAICS codes associated with multiple point source categories in the load for each category, double- or triple-counting the loads from these NAICS codes. Table 4-4 presents the NAICS codes associated with multiple point source categories, and identifies the applicable point source categories.

Table 4-4. NAICS Codes Counted in Multiple Point Source Categories

NAICS Code	NAICS Description	Applicable Point Source Categories
331521	Aluminum Die-Casting Foundries	Nonferrous Metals Manufacturing (40 CFR Part 421) and Aluminum Forming (40 CFR Part 467) ^a
332112	Nonferrous Forging	Aluminum Forming (40 CFR Part 467), Copper Forming (40 CFR Part 468), and Nonferrous Metals Forming and Metal Powders (40 CFR Part 471) ^b
332992	Small Arms Ammunition Manufacturing	Metal Finishing (40 CFR Part 433) and Nonferrous Metals Forming and Metal Powders (40 CFR Part 471)
332993	Ammunition (except Small Arms) Manufacturing	Metal Finishing (40 CFR Part 433) and Nonferrous Metals Forming and Metal Powders (40 CFR Part 471)
332999	All Other Miscellaneous Fabricated Metal Product Manufacturing	Metal Finishing (40 CFR Part 433), Aluminum Forming (40 CFR Part 467), Copper Forming (40 CFR Part 468), and Nonferrous Metals Forming and Metal Powders (40 CFR Part 471) ^c
335921	Fiber Optic Cable Manufacturing	Glass Manufacturing (40 CFR Part 426) and Plastics Molding and Forming (40 CFR Part 463)
335929	Other Communication and Energy Wire Manufacturing	Aluminum Forming (40 CFR Part 467), Copper Forming (40 CFR Part 468), and Nonferrous Metals Forming and Metal Powders (40 CFR Part 471)
562211	Hazardous Waste Treatment and Disposal	Centralized Waste Treatment (40 CFR Part 437), Waste Combustors (40 CFR Part 444), and Landfills (40 CFR Part 445) ^d

Table 4-4. NAICS Codes Counted in Multiple Point Source Categories

NAICS Code	NAICS Description	Applicable Point Source Categories
562219	Other Nonhazardous Waste Treatment and Disposal	Centralized Waste Treatment (40 CFR Part 437), Waste Combustors (40 CFR Part 444), and Landfills (40 CFR Part 445) ^d

^a EPA reviewed publicly available information for these facilities and determined that some reporting this NAICS code have operations applicable to the Metal Molding and Casting Category (40 CFR Part 464). EPA assigned these facilities the NAICS code 331521MMC to link to the Metal Molding and Casting Category in the NAICS/Point Source Category Crosswalk (see Section 4.3.1.2).

^b EPA reviewed publicly available information for these facilities and determined that some reporting this NAICS code have operations applicable to the Iron and Steel Manufacturing Category (40 CFR Part 420) and the Metal Finishing Category (40 CFR Part 433). EPA assigned the NAICS code 332112IRON to facilities generating wastewater to which the Iron and Steel ELGs apply and the NAICS code 332112MF to facilities generating wastewater to which the Metal Finishing ELGs apply (see Section 4.3.1.2).

^c EPA reviewed publicly available information for these facilities and determined that some reporting this NAICS code have operations that are applicable to the Metal Finishing Category (40 CFR Part 433) and the Nonferrous Metals Forming and Metal Powders Category (40 CFR Part 471). EPA assigned the NAICS code 332999DC to these facilities (see Section 4.3.1.2). EPA determined that some facilities reporting this NAICS code have operations that are applicable to the Aluminum Forming Category (40 CFR Part 467), Copper Forming Category (40 CFR Part 468), and Nonferrous Metals Forming and Metal Powders Category (40 CFR Part 471). EPA assigned the NAICS code 332999TC to these facilities (see Section 4.3.1.2).

^d EPA reviewed publicly available information for these facilities and identified facilities with operations applicable to the Centralized Waste Treatment Category (40 CFR Part 437) with the NAICS code CWT. EPA assigned the NAICS code WC to facilities with operations applicable to the Waste Combustor Category (40 CFR Part 444). EPA assigned the NAICS code LNDLFL to facilities with operations applicable to the Landfills Category (40 CFR Part 445). Facilities with multiple operations were counted in all the applicable categories.

4.3.1.2 NAICS Codes Divided Among Point Source Categories

As noted previously, some facilities are subject to regulations from more than one point source category. EPA was able to assign some of these discharges to the appropriate category and avoid double counting by carrying over changes made during previous annual reviews. EPA made some of these assignments at the facility level, the pollutant level, and the discharge level, as discussed below.

Facility-Level Point Source Category Assignment

For NAICS codes that include facilities subject to more than one point source category, EPA reviewed available information about pollutant loads and manufacturing operations to assign each facility to the category that applied to its discharges. Table 4-5 presents the NAICS codes that EPA assigned to point source categories at the facility level. In future databases, EPA will review facilities with significant TWPE in each of these NAICS codes to determine if they are assigned to the appropriate point source category.

Table 4-5. Facility-Level Point Source Category Assignment NAICS Codes

NAICS	Primary Associated Point Source Category	Other Associated Point Source Categories	Expanded NAICS Code (Assigned at the Facility Level)
311119: Other Animal Food Manufacturing	Food and Kindred Products Potential New Point Source Category ^a	Grain Mills (40 CFR Part 406)	311119GRAIN
		Meat and Poultry Products (40 CFR Part 432)	311119MPP
		Pharmaceutical Manufacturing (40 CFR Part 439)	311119PH
311225: Fats and Oils Refining and Blending	Miscellaneous Foods and Beverages Potential New Point Source Category ^a	Fertilizer Manufacturing Category (40 CFR Part 418)	311225FER
311999: All Other Miscellaneous Food Manufacturing	Miscellaneous Foods and Beverages Potential New Point Source Category ^a	Dairy Products Processing (40 CFR Part 405)	311999DPP
		Grain Mills (40 CFR Part 406)	311999GRAIN
		Organic Chemicals, Plastics, and Synthetic Fibers (40 CFR Part 414)	311999OCPSF
		Meat and Poultry Products (40 CFR Part 432)	311999MPP
315992: Glove and Mitten Manufacturing	Textile Mills (40 CFR Part 410)	Rubber Manufacturing (40 CFR Part 428)	315992RUB
		Apparel and Other Textile Products Potential New Subcategory of Textile Mills (40 CFR Part 410)	315992AP
324199: All Other Petroleum and Coal Products Manufacturing	Petroleum Refining (40 CFR Part 419)	Organic Chemicals, Plastics, and Synthetic Fibers (40 CFR Part 414)	324199OCPSF
325120: Industrial Gas Manufacturing	Inorganic Chemicals Manufacturing (40 CFR Part 415)	Organic Chemicals, Plastics, and Synthetic Fibers (40 CFR Part 414)	325120OCPSF
325188: All Other Basic Inorganic Chemical Manufacturing	Inorganic Chemicals Manufacturing (40 CFR Part 415)	Organic Chemicals, Plastics, and Synthetic Fibers (40 CFR Part 414)	325188OCPSF
		Soap and Detergent Manufacturing (40 CFR Part 417)	325188SD
		Nonferrous Metals Manufacturing (40 CFR Part 421)	325188NMM
		Phosphate Manufacturing (40 CFR Part 422)	325188PHOS
		Copper Forming (40 CFR Part 468)	325188COP
		Pharmaceutical Manufacturing (40 CFR Part 439)	325188PH
		Nonferrous Metals Forming and Metal Powders (40 CFR Part 471)	325188NMF
325510: Paint and Coating Manufacturing	Paint Formulating (40 CFR Part 446)	Cement Manufacturing (40 CFR Part 411)	325510CEM
		Electroplating (40 CFR Part 413)	325510ELEC
		Organic Chemicals, Plastics, and Synthetic Fibers (40 CFR Part 414)	325510OCPSF
		Inorganic Chemicals Manufacturing (40 CFR Part 415)	325510INORG

Table 4-5. Facility-Level Point Source Category Assignment NAICS Codes

NAICS	Primary Associated Point Source Category	Other Associated Point Source Categories	Expanded NAICS Code (Assigned at the Facility Level)
325611: Soap and Other Detergent Manufacturing	Soap and Detergent Manufacturing (40 CFR Part 417)	Organic Chemicals, Plastics, and Synthetic Fibers (40 CFR Part 414)	325611OCPSF
325998: All Other Miscellaneous Chemical Product and Preparation Manufacturing	Organic Chemicals, Plastics, and Synthetic Fibers (40 CFR Part 414)	Business Services Potential New Point Source Category	325998BS
		Inorganic Chemicals Manufacturing (40 CFR Part 415)	325998INORG
		Soap and Detergent Manufacturing (40 CFR Part 417)	325998SD
		Petroleum Refining (40 CFR Part 419)	325998PR
		Metal Finishing (40 CFR Part 433)	325998MF
		Pharmaceutical Manufacturing (40 CFR Part 439)	325998PH
		Pesticide Chemicals (40 CFR Part 455)	325998P
		Nonferrous Metals Forming and Metal Powders (40 CFR Part 471)	325998NMF
326199: All Other Plastics Product Manufacturing	Plastics Molding and Forming (40 CFR Part 463)	Electroplating (40 CFR Part 413)	326199ELEC
		Organic Chemicals, Plastics, and Synthetic Fibers (40 CFR Part 414)	326199OCPSF
		Glass Manufacturing (40 CFR Part 426)	326199GLASS
		Metal Finishing (40 CFR Part 433)	326199MF
331111: Iron and Steel Mills	Iron and Steel Manufacturing (40 CFR Part 420)	Metal Finishing (40 CFR Part 433)	331111MF
		Nonferrous Metals Forming and Metal Powders (40 CFR Part 471)	331111NMF
331221: Rolled Steel Shape Manufacturing	Iron and Steel Manufacturing (40 CFR Part 420)	Electroplating (40 CFR Part 413)	331221ELEC
		Nonferrous Metals Forming and Metal Powders (40 CFR Part 471)	331221NMF
331314: Secondary Smelting and Alloying of Aluminum	Nonferrous Metals Manufacturing (40 CFR Part 421)	Metal Finishing (40 CFR Part 433)	331314MF
		Metal Molding and Casting (40 CFR Part 464)	331314MMC
		Aluminum Forming (40 CFR Part 467)	331314AL
331423: Secondary Smelting, Refining, and Alloying of Copper	Nonferrous Metals Manufacturing (40 CFR Part 421)	Metal Molding and Casting (40 CFR Part 464)	331423MMC
		Nonferrous Metals Forming and Metal Powders (40 CFR Part 471)	331423NMF
331491: Nonferrous Metal (except Copper and Aluminum) Rolling, Drawing, and Extruding	Nonferrous Metals Forming and Metal Powders (40 CFR Part 471)	Metal Finishing (40 CFR Part 433)	331491MF
331492: Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)	Nonferrous Metals Manufacturing (40 CFR Part 421)	Copper Forming (40 CFR Part 468)	331492COP
		Nonferrous Metals Forming and Metal Powders (40 CFR Part 471)	331492NMF
331521: Aluminum Die-Casting Foundries b	Nonferrous Metals Manufacturing (40 CFR Part 421) and Aluminum Forming (40 CFR Part 467)	Metal Molding and Casting (40 CFR Part 464)	331521MMC

Table 4-5. Facility-Level Point Source Category Assignment NAICS Codes

NAICS	Primary Associated Point Source Category	Other Associated Point Source Categories	Expanded NAICS Code (Assigned at the Facility Level)
332112: Nonferrous Forging b	Nonferrous Metals Manufacturing (40 CFR Part 421); Aluminum Forming (40 CFR Part 467); and Copper Forming (40 CFR Part 468)	Iron and Steel Manufacturing (40 CFR Part 420)	332112IRON
		Metal Finishing (40 CFR Part 433)	332112MF
332618: Other Fabricated Wire Product Manufacturing	Metal Finishing (40 CFR Part 433)	Iron and Steel Manufacturing (40 CFR Part 420)	332618IRON
		Nonferrous Metals Forming and Metal Powders (40 CFR Part 471)	332618NMF
		Printing and Publishing Potential New Point Source Category a	332618PP
332813: Electroplating, Plating, Polishing, Anodizing, and Coloring	Electroplating (40 CFR Part 413)	Iron and Steel Manufacturing (40 CFR Part 420)	332813IRON
		Metal Finishing (40 CFR Part 433)	332813MF
		Plastics Molding and Forming (40 CFR Part 463)	332813PMF
		Aluminum Forming (40 CFR Part 467)	332813AL
		Printing and Publishing Potential New Point Source Category a	332813PP
332999: All Other Miscellaneous Fabricated Metal Product Manufacturing	Metal Finishing (40 CFR Part 433)	Metal Finishing (40 CFR Part 433) and Nonferrous Metals Forming and Metal Powders (40 CFR Part 471)	332999DC ^b
		Aluminum Forming (40 CFR Part 467); Copper Forming (40 CFR Part 468); and Nonferrous Metals Forming and Metal Powders (40 CFR Part 471)	332999TC ^b
336340: Motor Vehicle Brake System Manufacturing	Metal Finishing (40 CFR Part 433)	Electroplating (40 CFR Part 413)	336340ELEC
336360: Motor Vehicle Seating and Interior Trim Manufacturing	Textile Mills (40 CFR Part 410)	Metal Finishing (40 CFR Part 433)	336360MF
337215: Showcase, Partition, Shelving, and Locker Manufacturing	Metal Finishing (40 CFR Part 433)	Timber Products Processing (40 CFR Part 429)	337215TIM

Table 4-5. Facility-Level Point Source Category Assignment NAICS Codes

NAICS	Primary Associated Point Source Category	Other Associated Point Source Categories	Expanded NAICS Code (Assigned at the Facility Level)
339999: All Other Miscellaneous Manufacturing	Metal Finishing (40 CFR Part 433)	Organic Chemicals, Plastics, and Synthetic Fibers (40 CFR Part 414)	339999OCPSF
		Mineral Mining and Processing (40 CFR Part 436)	339999MIN
		Pesticide Chemicals (40 CFR Part 455)	339999P
		Plastics Molding and Forming (40 CFR Part 463)	339999PMF
		Nonferrous Metals Forming and Metal Powders (40 CFR Part 471)	339999NMF

^a As part of the Final 2006 Plan, EPA determined that categorical pretreatment standards were not warranted for the these industries (U.S. EPA, 2006b).

^b A single NAICS code may include facilities subject to more than one point source category. EPA included the loads from NAICS codes associated with multiple point source categories in the load for each category, double- or triple-counting the loads from these NAICS codes (see Section 4.3.1.1).

EPA is currently considering revisions to a subpart of the ELGs for Organic Chemicals, Pesticides, and Synthetic Fibers (OCPSF) (40 CFR 414) and Inorganic Chemicals Manufacturing (40 CFR 415) for facilities that produce chlorine and chlorinated hydrocarbons (CCH). Because the CCH rulemaking is underway, EPA assigned the NAICS code “VCCA” to the CCH facilities in the NAICS/Point Source Category Crosswalk to separately identify these facilities (Note: VCCA, vinyl chloride and chlor alkali, is the former name of the CCH rulemaking). The list of CCH facilities in *TRI Releases 2007* is included in Table C-6 in Appendix C.

As part of the Pulp, Paper, and Paperboard Category (Pulp and Paper Category) (40 CFR Part 430) Detailed Study (U.S. EPA, 2006a), EPA reviewed the operations of facilities reporting SIC codes 2611: Pulp Mills, 2621: Paper Mills, and 2631: Paperboard Mills to determine the applicable subpart for each facility. A 1988 legal suit obligated EPA to address discharges of polychlorinated dibenzo-(p)-dioxins and polychlorinated dibenzofurans from 104 bleaching pulp mills, including nine dissolving pulp mills. During its response to the 1988 legal suit, EPA decided to review and revise the Pulp and Paper Category regulations in three phases. EPA addressed Phase I first, chose not to revise the ELGs for Phase II, and chose to support NPDES permit writers individually in developing permit-specific effluent limitations to control discharges of these chemicals from the remaining operating mills in Phase III. Because the Pulp and Paper Category regulations are subcategorized by process used and product produced they do not correspond to SIC codes. Therefore, EPA added “-1” to the SIC codes of facilities that met the applicability of Phase I:

- Subpart B (Bleached Papergrade Kraft and Soda); and
- Subpart E (Papergrade Sulfite).

EPA added “-2” to the SIC codes of facilities that met the applicability of Phase II:

- Subpart C (Unbleached Kraft);
- Subpart F (Semi-Chemical);

- Subpart G (Groundwood, Chemic-Mechanical, and Chemic-Thermo-Mechanical);
- Subpart H (Non-Wood Chemical Pulp);
- Subpart I (Secondary Fiber Deink);
- Subpart J (Secondary Fiber Non-Deink);
- Subpart K (Fine and Lightweight Papers from Purchased Pulp); and
- Subpart L (Tissue, Filter, Non-Woven and Paperboard from Purchased Pulp).

EPA added “-3” to the SIC codes of facilities that met the applicability of Phase III:

- Subpart A (Dissolving Kraft); and
- Subpart D (Dissolving Sulfite).

EPA carried the facility-specific changes from the 2004 and 2005 screening-level reviews to the *TRIReleases2007* database by appending “-1”, “-2”, and “-3” to the NAICS codes for facilities in the Pulp and Paper Category.

Discharge-Level Point Source Category Assignment

Regulations for the Electroplating Category (40 CFR Part 413) apply to discharges from indirect discharging facilities, while direct discharging electroplating operations are regulated by the Metal Finishing Category (40 CFR Part 433). EPA determined facilities reporting the following NAICS codes may have electroplating operations:

- 325510: Paint and Coating Manufacturing;
- 326199: All Other Plastics Products Manufacturing;
- 331221: Rolled Steel Shape Manufacturing;
- 332813: Electroplating, Plating, Polishing, Anodizing, and Coloring; and
- 336340: Motor Vehicle Brake System Manufacturing.

In *TRIReleases2007* facilities can report direct and indirect discharges. Therefore, as part of the 2009 screening-level review, for facilities reporting the above NAICS codes EPA assigned direct discharges to the Metal Finishing Category by appending “MF” to the facility’s discharge-level NAICS code (e.g., EPA revised direct discharges from NAICS code 332813 to 332813MF).

Pollutant-Level Point Source Category Assignment

For most facilities that discharge wastewater subject to more than one point source category, EPA was not able to divide the pollutant discharges between applicable point source categories. The following subsections discuss two exceptions where EPA was able to assign wastewater discharges of certain chemicals to the appropriate point source category.

Organic Chemicals, Plastics, and Synthetic Fibers/Pesticides

The OCPSF ELGs (40 CFR Part 414) may apply to discharges from facilities in the following NAICS codes:

- 325132: Synthetic Organic Dye and Pigment Manufacturing;
- 325192: Cyclic Crude and Intermediate Manufacturing;
- 325199: All Other Basic Organic Chemical Manufacturing;

- 325211: Plastics Material and Resin Manufacturing;
- 325221: Cellulosic Organic Fiber Manufacturing; and
- 325222: Noncellulosic Organic Fiber Manufacturing.

In addition, EPA is considering including operations from the following 16 NAICS codes as potential new subcategories of the OCPSF Category:

- 311999OCPSF: All Other Miscellaneous Food Manufacturing;
- 324199OCPSF: All Other Petroleum and Coal Products Manufacturing;
- 325510: Petrochemical Manufacturing;
- 325120OCPSF: Industrial Gas Manufacturing;
- 325188OCPSF: All Other Basic Inorganic Chemical Manufacturing;
- 325193: Ethyl Alcohol Manufacturing;
- 325510OCPSF: Paint and Coating Manufacturing;
- 325520: Adhesive Manufacturing;
- 325611OCPSF: Soap and Other Detergent Manufacturing;
- 325612: Polish and Other Sanitation Good Manufacturing;
- 325620: Toilet Preparation Manufacturing;
- 325998: All Other Miscellaneous Chemical Product and Preparation Manufacturing;
- 326199OCPSF: All Other Plastics Product Manufacturing;
- 339999OCPSF: All Other Miscellaneous Manufacturing;
- 424690: Other Chemical and Allied Products Merchant Wholesalers; and
- 562920: Materials Recovery Facilities.

Some facilities in the regulated NAICS codes and NAICS codes of the potential new subcategory manufacture and/or formulate pesticides as well as other organic chemicals. Regulations for the Pesticide Chemicals Category (40 CFR Part 455) control discharges from pesticide operations. For the screening-level analysis of discharges from existing categories, EPA therefore subtracted all pesticide discharges from OCPSF and counted them as discharges from the Pesticides Chemicals Category, by appending a “P” to the facility’s pollutant-level SIC code (e.g., EPA revised pesticide discharges from NAICS code 325199 to NAICS code 325199P). EPA developed this methodology as part of the 2005 annual review for use with the PCS and TRI data. EPA did not change the methodology for the 2009 annual review.

EPA used a table containing a list of pesticides and their CAS numbers in order to identify the pesticide releases from the OCPSF Category for both the DMR and TRI databases. In developing the list of pesticides, EPA started with the list of 272 pesticide active ingredients that was created during the most recent pesticides rulemaking. Some of the pesticides in the list of 272 active ingredients were multiple compounds, for example “2,4 D salts and esters” and “organo-tin pesticides,” and were not identified by CAS number. EPA identified individual chemicals and CAS numbers for active ingredients in these groups and added them to the pesticides list. All of the chemicals identified from the list of 272 pesticide active ingredients were included in the pesticides list, except for biphenyl and dichlorobenzene. Biphenyl and dichlorobenzene were not included because EPA determined that OCPSF facilities use these chemicals for specific manufacturing uses not related to pesticides.

EPA identified additional pesticide active ingredients by using the 1988 FIFRA and TSCA Enforcement System (FATES) Database and a list created in 2003 by the Office of Pesticide Programs (OPP). EPA combined the two lists and determined which of the pesticide active ingredients facilities reported having discharged in TRI in 2007. For releases reported in the 2007 TRI, EPA determined whether the pesticide active ingredient had significant non-pesticide related manufacturing uses. Chemicals, such as acrolein, trichlorofluoromethane, silver, and sulfuric acid, whose primary use was non-pesticide-related were not added to the list, while chemicals whose primary purpose was pesticide-related were added to the list. The list of chemicals reported in TRI and DMR that EPA considered pesticides for the purpose of its screening-level analysis of discharges from existing categories contains 415 chemicals.

MP&M/Metal Finishing

Regulations for the Metal Finishing Category (40 CFR Part 433) may apply to discharges from facilities in 198 NAICS codes for which discharges were reported in TRI in 2007. Regulations for the Metal Products and Machinery (MP&M) Category (40 CFR Part 438) may apply to some of the pollutants directly discharged by facilities in 165 of these NAICS codes. The final MP&M rule at 40 CFR Part 438.1(b) specifically excludes both metal-bearing wastewaters and wastewaters subject to other effluent guidelines (e.g., Metal Finishing). For its screening-level analysis of discharges from existing categories, EPA developed methodologies to apportion pollutant loads between the MP&M and Metal Finishing Categories.

The MP&M rule as promulgated regulates oil and grease (O&G) and total suspended solids (TSS) in direct discharges from certain facilities that generate oily wastewater; it does not specifically regulate any other chemicals. EPA used the list of organic “pollutants of concern” it had developed for the MP&M rule and identified 48 pollutants in the TRI databases, including O&G and TSS. For the 2009 screening-level analysis, EPA counted all discharges of these pollutants from the 165 MP&M NAICS codes in *TRIReleases2007* as MP&M discharges. EPA counted discharges of all other chemicals from these facilities in the Metal Finishing Category in *TRIReleases2007*. EPA believes that the identified pollutants are those that are most likely associated with the non-metal bearing oily waste streams subject to the MP&M regulations, and that this apportionment, which avoids double counting pollutant loads, is a reasonable approach for screening-level analysis of discharges from existing categories.

For the 2009 annual review, as for previous reviews, EPA matched TRI pollutants to the list of 88 MP&M chemicals using CAS numbers and the SUPERCAS table (described in Section 1). Using the SUPERCAS table, EPA matched 48 chemicals to the list of 88 organic “pollutants of concern” for the MP&M rule that are discharged by facilities in the 165 MP&M NAICS codes. EPA identified these 48 chemicals as “Controlled by MP&M.” Table C-4 in Appendix C lists the 88 organic “pollutants of concern” for the MP&M rule. Table C-7 in Appendix C presents the list of TRI chemicals allocated to MP&M for the 2009 annual review.

4.4 Potential New Point Source Categories

Concurrent with its review of existing point source categories, EPA also reviews industries not currently subject to effluent guidelines to identify potential new point source categories. EPA conducts a “crosswalk” analysis based on data in DMR and TRI. Facilities with data in DMR and TRI are identified by a four-digit SIC code or six-digit NAICS code (Section 4.1 provides more details on SIC and NAICS codes, respectively). EPA links each four-digit SIC

code and six-digit NAICS code to an appropriate industrial category (i.e., “the crosswalk”).¹⁹ This crosswalk identifies SIC codes and NAICS codes that EPA associated with industries subject to an existing guideline. The crosswalk also identifies SIC and NAICS codes not associated with an existing guideline. In addition to the crosswalk analysis, EPA relies on stakeholder comments to identify potential new point sources categories.

For each industry identified through the crosswalk analysis or stakeholder comments, EPA evaluates whether it constitutes a potential new *category* subject to identification in the plan or whether it is properly considered a potential new *subcategory* of an existing point source category. To make this determination, EPA generally looks at whether the industry produces a similar product or performs a similar service as an existing category. If so, EPA generally considers the industry to be a potential new subcategory of that category. If, however, the industry is significantly different from existing categories in terms of products or services provided, EPA considers the industry as a potential new stand-alone category subject to identification in the plan.

4.4.1 Direct Discharges

Because the CWA has different requirements for potential new categories of direct and indirect dischargers, EPA examines potential new categories to determine if the category comprises mostly indirect dischargers or if it comprises both direct and indirect dischargers. If a category consists largely of indirect dischargers, EPA evaluates the pass-through and interference potential of the category discharges (see Section 3.4 of the *Technical Support Document for the Preliminary 2010 Effluent Guidelines Program Plan* (U.S. EPA, 2009)). If a category consists largely of direct dischargers, EPA evaluates the type of pollutants discharged by facilities in the category.

4.4.2 Indirect Discharges

For potential new categories with primarily indirect dischargers, EPA evaluates the potential for the wastewater discharges to “interfere with, pass through, or [be] otherwise incompatible with” the operation of POTWs. See 33 U.S.C. § 1371(b)(1). Using available data, EPA reviews the types of pollutants in an industry’s wastewater. Then, EPA reviews the likelihood of those pollutants to pass through a POTW. For most categories, EPA evaluated the “pass through potential” as measured by: (1) the total annual TWPE discharged by the industrial sector; and (2) the average TWPE discharge among facilities that discharge to POTWs. EPA also assesses the interference potential of the discharge. Finally, EPA considers whether the pollutant discharges are already adequately controlled by general pretreatment standards and/or local pretreatment limits.

4.5 Identification of Point Source Category References

1. Office of Management and Budget (OMB). 1987. *Standard Industrial Classification Manual*. (Unknown). EPA-HQ-TRI-2008-0564-0070.

¹⁹ For additional information on “the crosswalk,” see Section 4.0 of the *2009 Technical Support Document for the Annual Review of Existing Effluent Guidelines and Identification of Potential New Point Source Categories* (U.S. EPA, 2009).

2. U.S. Census Bureau. 2009. North American Industry Classification System (NAICS) Introduction. (Unknown). EPA-HQ-OW-2007-0571 DCN 06730.
3. U.S. EPA. 2005. *2005 Annual Screening-Level Analysis: Supporting the Annual Review of Existing Effluent Limitations Guidelines and Standards and Identification of New Point Source Categories for Effluent Limitations and Standards*. EPA-821-B-05-003. Washington, DC. (August). EPA-HQ-OW-2004-0032-0901.
4. U.S. EPA. 2006a. *Final Report: Pulp, Paper, and Paperboard*. EPA-821R-06-016. Washington, DC. (November). EPA-HQ-OW-2004-0032-2249.
5. U.S. EPA. 2006b. *Technical Support Document for the 2006 Effluent Guidelines Program Plan*. EPA-821-R-06-018. Washington, DC. (December). EPA-HQ-OW-2004-0032-2782.
6. U.S. EPA. 2009. *Preliminary 2010 Effluent Guidelines Program Plan Technical Support Document*. Washington, D.C. EPA-821-R-09-009. (October). EPA-HQ-OW-2008-0517 DCN 06703.
7. Wolford, Jessica. Eastern Research Group, Inc. 2005. Memorandum to 2006 Effluent Guidelines Program Plan Docket. RE: Identification of Facilities for the Porcelain Enameling Point Source Category. (August). EPA-HQ-OW-2004-0032-0945.

5. TOXIC WEIGHTING FACTORS

DMRLoads2007 and *TRIReleases2007* provide chemical discharge information in the form of mass loads. In order to rank the human health and environmental hazard potential of these loads, EPA estimates toxic-equivalent mass discharges using toxic weighting factors (TWFs). EPA's Engineering and Analysis Division (EAD) developed TWFs for use in its effluent limitations guidelines and standards (ELGs) development program to allow comparison of pollutants with varying toxicities. The toxic-weighted pound equivalent (TWPE) is the mass of a pollutant or chemical discharged that accounts for its relative toxicity. EPA calculates TWPE by multiplying the mass (in pounds) of the chemical by its TWF. The remainder of this section is divided into the following subsections:

- Section 5.1 – TWF background and development;
- Section 5.2 – New TWFs developed during the 2009 Annual Review;
- Section 5.3 – Chemicals for which EPA has not developed TWFs; and
- Section 5.4 – TWF References.

5.1 TWF Background and Development

In developing ELGs, EPA developed a wide variety of tools and methodologies to evaluate effluent discharges. EPA's Office of Water, EAD maintains a Toxics Database compiled from over 100 references for more than 1,900 pollutants. The Toxics Database includes aquatic life and human health toxicity data, as well as physical and chemical property data. The pollutants in this database are identified by a unique Chemical Abstract Service (CAS) number. EPA calculates TWFs from these data to account for differences in toxicity across pollutants and to provide the means to compare mass loadings of different pollutants. In its analyses, EPA multiplies a mass loading of a pollutant in pounds per year (lb/yr) by a pollutant-specific weighting factor to derive a "toxic-equivalent" loading (lb-equivalent/yr). Throughout this document, the toxic-equivalent is also referred to as toxic-weighted pound equivalents, or TWPE. The development of TWFs is discussed in detail in the Draft and Final TWF Development Documents (U.S. EPA, 2005; U.S. EPA, 2006).

EPA derives TWFs from chronic aquatic life criteria (or toxic effect levels) and human health criteria (or toxic effect levels) established for the consumption of fish. In the TWF method for assessing water-based effects, these aquatic life and human health toxicity levels are compared to a benchmark value that represents the toxicity level of a specified pollutant. EPA selected copper, a metal commonly detected and removed from industrial effluent, as the benchmark pollutant. The Final TWF Development Document contains details on how EPA developed its TWFs (U.S. EPA, 2006). Table D-1 in Appendix D lists the TWFs for those chemicals in the *DMRLoads2007* and *TRIReleases2007* databases for which EPA has developed TWFs.

5.2 New Toxic Weighting Factors Developed During the 2009 Annual Review

During the 2009 annual review, EPA revised the TWF for boron to reflect updated information. EPA did not revise any other TWFs or develop TWFs for any chemicals that had not previously had TWFs as part of the 2009 annual review (Abt, 2008). Table 5-1 lists the revised boron TWF. Boron is reported in both *DMRLoads2007* and *TRIReleases2007*.

Table 5-1. Revised Boron TWF

Pollutant	CAS Number	Old TWF	New TWF
Boron	7440428	0.177	0.0083

Source: Memorandum to Josh Hall, U.S. EPA. Subject: Revised Draft – Updating the Boron TWF (Abt, 2008).

5.3 Chemicals without Toxic Weighting Factors

EAD has not yet developed TWFs for all chemicals in the *DMRLoads2007* and *TRIRelases2007* databases. Table 5-2 lists the 29 chemicals in *TRIRelases2007* that do not have TWFs. The total discharge of the chemicals in Table 5-2 for *TRIRelases2007* is 17,100,000 pounds. Table 5-3 lists the chemicals in *DMRLoads2007* that do not have TWFs. The total discharge of the chemicals in Table 5-3 for *DMRLoads2007* is 9.52 billion pounds. Of these discharges, 3 percent relate to nitrogen- and phosphorous- containing compounds that may act as nutrients. TWFs are not good indicators of the impact of nutrients on water quality. While nutrients may have toxic effects that can be reflected in TWFs, their more important effect on water quality occurs through their promotion of eutrophication²⁰. EPA conducted a screening-level analysis of nutrient discharges, which ranked point source categories based on *DMRLoads2007* nitrogen and phosphorous compound loads. The results of this analysis are presented in Section 3.2.5.

Table 5-2. Chemicals with no TWFs in *TRIRelases2007*

CAS Number	Chemical Name	Total Pounds Released ^a
872504	N-METHYL-2-PYRROLIDONE	13,999,796
N503	NICOTINE AND SALTS	2,818,643
7782414	FLUORINE	97,777
N120	DIISOCYANATES	38,774
306832	2,2-DICHLORO-1,1,1-TRIFLUOROETHANE	37,940
191242	BENZO(G,H,I)PERYLENE	34,819
1344281	ALUMINUM OXIDE (FIBROUS FORMS)	34,495
75456	CHLORODIFLUOROMETHANE	33,565
149304	2-MERCAPTOBENZOTHIAZOLE	20,573
2837890	2-CHLORO-1,1,1,2-TETRAFLUOROETHANE	17,219
554132	LITHIUM CARBONATE	11,444
94360	BENZOYL PEROXIDE	2,996
N583	POLYCHLORINATED ALKANES	2,705
64755	TETRACYCLINE HYDROCHLORIDE	804
28407376	C.I. DIRECT BLUE 218	302

²⁰ Eutrophication occurs when nitrogen, phosphorous, and other nutrients in a body of water stimulate the growth of algae. Nutrients flow through ecosystems constantly and eutrophication is a natural process that gradually turns ponds into wetlands and wetlands into meadows. However, when human activity introduces additional nutrients to the natural system, algal growth can become extreme and overwhelm the ecosystem's capacity. This over-fertilization can cause increased turbidity, nuisance, or toxic, algal blooms, changes in biota, and anoxia. All of these effects reduce the level and value of ecosystem services provided by water bodies.

Table 5-2. Chemicals with no TWFs in *TRIReleases2007*

CAS Number	Chemical Name	Total Pounds Released ^a
422560	3,3-DICHLORO-1,1,1,2,2-PENTAFLUOROPROPANE	239
924425	N-METHYLOLACRYLAMIDE	158
79947	TETRABROMOBISPHENOL A	23
764410	1,4-DICHLORO-2-BUTENE	21
612839	3,3'-DICHLOROBENZIDINE DIHYDROCHLORIDE	9
71751412	ABAMECTIN	7
354143	1,1,2,2-TETRACHLORO-1-FLUOROETHANE	5
26628228	SODIUM AZIDE	5
26471625	TOLUENE DIISOCYANATE (MIXED ISOMERS)	0.4
75683	1-CHLORO-1,1-DIFLUOROETHANE	0.02
1928434	2,4-D 2-ETHYLHEXYL ESTER	0.0002
98884	BENZOYL CHLORIDE	0
7664939	SULFURIC ACID (1994 AND AFTER "ACID AEROSOLS" ONLY)	0
7647010	HYDROCHLORIC ACID (1995 AND AFTER "ACID AEROSOLS" ONLY)	0
Total		17,100,000

Source: *TRIReleases2007_v2*.^a Includes transfers to POTWs and accounts for POTW removals.**Table 5-3. Chemicals with no TWFs in *DMRLoads2007***

CAS Number	PRAM Code	Chemical Name	Total Pounds Released
00900	471341	Hardness, total (as CaCO ₃)	3,043,209,486
TSS		Total Suspended Solids	3,039,742,485
00515		Residue, tot fltrble (dried at 105 C)	1,069,455,416
BOD5		BOD, 5-day	384,518,697
79855		Adsorbable organic halides (AOX)	281,109,733
78470	7727379	Nitrogen, sludge, tot, dry wt. (as N)	270,173,870
00340		Oxygen demand, chem. (high level) (COD)	269,728,827
78477		Solids, sludge, tot, dry weight	212,062,831
51503	10043524	Calcium Chloride	173,744,369
81017		Chemical Oxygen Demand (COD)	158,007,360
00300	7782447	Oxygen, dissolved (DO)	138,838,601
00335		Oxygen demand, chem. (low level) (COD)	134,291,135
CARBON	7440440	Total Carbon	115,774,628
80103		Chemical oxygen demand (COD)	36,770,720
CBOD		Carbonaceous BOD, 5-day	30,325,446
00181		Oxygen demand, ultimate	24,249,650
PHOSP		Phosphorus	21,673,603

Table 5-3. Chemicals with no TWFs in *DMRLoads2007*

CAS Number	PRAM Code	Chemical Name	Total Pounds Released
03594		Halogens, adsorbable organic	11,634,478
TKN	7727379	Total Kjeldahl Nitrogen	7,890,284
00410	471341	Alkalinity, total (as CaCO ₃)	7,490,718
SIO ₂	7631869	Silica	5,617,674
00440	71523	Bicarbonate ion- (as HCO ₃)	5,265,556
46570		Hardness, Ca Mg Calculated (mg/L as CaCO ₃)	5,048,590
80108		Chemical oxygen demand (COD)	4,916,094
78240		Metals, total	4,099,529
00341		Oxygen demand, chem. (COD), dissolved	3,137,358
NOX	7727379	Nitrogen, oxidized	3,027,222
00343		Oxygen demand, total (tod)	2,893,253
34044		Oxidants, total residual	1,802,491
ORGN	7727379	Nitrogen, organic	1,456,316
80087		BOD, carbonaceous, 20 day, 20 C	1,448,164
32017	7647145	Sodium chloride (salt)	1,077,614
51450		Nitrite Plus Nitrate Total	854,958
78115		Halogen, total organic	557,377
00640	7727379	Nitrogen, inorganic total	343,917
00319		BOD, (ult. all stages)	330,952
TTC1A		Static 4Day Chronic Selen. Capricornutum	318,731
51404		Solids, total suspd. non-volatile	271,229
71872	13863417	Bromine chloride	259,617
34045		Oxidants, free available	220,001
78733		Volatile fraction organics (EPA 624)	189,068
70353		Organic halides, total	185,054
PO ₄	14265442	Phosphate	173,386
PO ₄		Phosphate	173,386
82209		Chlorides & sulfates	165,812
HC	308067530	Total Hydrocarbons	111,168
00415		Alkalinity, phenolphthaline method	108,716
51360	98486	m-Benzenedisulfonic acid	107,605
39942	63231516	Hydrocarbons, aromatic	106,144
78157	1338245	Naphthenic acid	93,603
U238	7440611	Uranium 238	78,333
00551		Hydrocarbons, in H ₂ O, IR, CC14 extractible chromatograph	66,577
03773		Chlorine produced oxidants	60,594
PO ₄ ASP	14265442	Phosphate as P	58,401
61194		Halogen, total residual	56,810
51521	335671	Perfluorooctanoic Acid	46,552

Table 5-3. Chemicals with no TWFs in *DMRLoads2007*

CAS Number	PRAM Code	Chemical Name	Total Pounds Released
45501		Petrol hydrocarbons, total recoverable	40,436
CFA	479618	Chlorophyll A	33,343
04370		Sum BOD and ammonia, water	32,830
FLORB	16872110	Fluoroborates	30,938
77517	98113	Benzenesulphonic acid	30,034
51340	98679	p-Phenolsulfonic acid	30,034
82214		pH change (range)	29,986
31667	8002059	Oil petroleum, total recoverable	23,635
80279		CBOD5/NH3-N	20,650
78218	999	Phenolic compounds, unchlorinated	18,149
80996		Spray irrigation	18,004
80126		BOD, carbonaceous, 5 day, 5 C	15,707
00740	14265453	Sulfite (as SO3)	14,980
71845	14798039	Nitrogen, ammonia total (as NH4)	12,154
78239		Metals, tox priority pollutants, total	11,888
72035		Pump hours	11,177
00314		BOD, nitrogen inhib 5-day (20 deg. C)	9,199
71870	24959679	Bromide (as Br)	8,510
50008		Priority pollutants total effluent	7,946
H2O2	7722841	Hydrogen peroxide	5,713
49922		Diesel range organics diesel, total, wtr	3,556
51065	3825261	Ammonium perfluorooctanoate	3,129
04251		Clamtrol CT-1, Total Water ^a	2,600
00664		Dock discharge of phosphorus ^b	2,267
78724	41663847	4-Nitro-N-methylphthalimide, total	2,057
51526		Perfluorooctanesulfonate	1,867
03604	999	Total phenols	1,784
22456	130498292	Polynuc aromatic HC per Method 610	1,599
47021		Methylene blue active substances	1,475
51523		Perfluorobutanoicsulfonate	1,426
00141		Solids, total susp per production	1,287
77066	497267	2-Methyl-1,3-dioxolane	1,224
51522		Perfluorobutanoic Acid	1,185
82180		Hydrocarbons, petroleum	1,082
01210	7440053	Palladium, total (as Pd)	842
78221		Organic pesticide chemicals (40 CFR455)	809
51525	754916	Perfluorooctanesulfonamide	792
85789	1563388	2,2-Dimethyl-2,3-dihydro-7-benzofuranol	689
DMDS	624920	Dimethyl disulfide	649

Table 5-3. Chemicals with no TWFs in *DMRLoads2007*

CAS Number	PRAM Code	Chemical Name	Total Pounds Released
01277		Total agg concentration #1	624
01142	7440213	Silicon, total	588
39117		Phthalate esters	520
51493	999	Phenolic Compounds, Total	507
00988		Iron and manganese, soluble	497
49875	5131668	Propylene glycol monobutyl ether	496
HCCB	27154445	Hexachlorocyclohexane	484
82560		Total pesticides	465
78456		Halomethanes, sum	374
51524		Perfluorobutanesulfonamide	321
CLPHN	1336352	Chlorinated phenols	313
00144		Combined metals sum	282
74052		Chlorinated hydrocarbons, general	276
34283	39638329	Bis(2-chloroisopropyl) ether	223
78155	30498352	Dichlorobenzyl trifluoride	157
81559	683534	Bromodichloroethane	155
85795		Xylene, meta & para in combination	137
39084		Total purgeable halocarbons	122
84085		Volatile organics detected	96
U308	7440611	Uranium 308	77
77247		Benzoic acids, total	74
85812	2809214	1-Hydroxyethylidene	60
49491		BTEX	41
00741	14265453	Sulfite (as S)	37
74053		Pesticides, general	35
77102	872504	N-Methyl-2-pyrrolidone	32
34521	191242	Benzo(ghi)perylene	24
ABS	42615292	Alkyl benzene sulfonates	24
82195		Thiocarbamates	16
51051		Tin, tri-organo-	16
00696		Nitrofurans	13
77226	108678	1,3,5-Trimethylbenzene	12
77672	120616	Dimethyl terephthalate	12
51437		N-Hexane	11
51438		SAS - 310, Total	11
51165	211578040	SAS - 305, total	8
78143	88164	Monochlorobenzyl trifluoride	6
81512	95169	Benzothiazole	5
77542	87854	Hexamethylbenzene	4

Table 5-3. Chemicals with no TWFs in *DMRLoads2007*

CAS Number	PRAM Code	Chemical Name	Total Pounds Released
51202		Sulfide-hydrogen sulfide (undissociated)	4
71910	7440575	Gold, total (as Au)	4
01168	7440746	Indium	4
34102	628966	Ethylene glycol dinitrate	4
45097	98839	Methylstyrene	3
78721		Phthalates, total	2
81611	26523648	Trichlorotrifluoroethane	2
73525	1338234	2-Butanone peroxide	2
49702	131748	Ammonium picrate	1
38579		Benzene, halogenated	1
70027		COD, 25N K ₂ Cr ₂ O ₇ , tot	0.3
39379		DDT/DDD/DDE, sum of p,p' & o,p' isomers	0.2
84103		Dioxin laboratory - alpha code	0.1
77086	108996	3-Methylpyridine	0.1
51009		RDX+HMX	0.004
82181		Hydrocarbons, total petroleum	0.001
01279		Total agg concentration #3	0.0003
76025	136677093	Chlorinated dibenzo-p-dioxins, effluent	0.0001
34679		2,3,7,8-TCDD TEC	0.000000004
00143	74931	Methyl mercaptan	0
00987		Iron and manganese, total	0
00973	1318098	Asbestos, total amphibole	0
01289		Biocides	0
00177		Oxygen demand, dissolved	0
01278		Total agg concentration #2	0
01288		Foaming agents	0
00148		Herbicides, total	0
78232		Total toxic organics (TTO) (40 CFR469)	0
77625	103333	Azobenzene	0
77666	77929	Citric acid	0
77676	30583336	Trichlorotoluene	0
77889	706785	Octachlorocyclopentene	0
77983	29797408	Dichlorotoluene	0
78028	12408105	Tetrachlorobenzene	0
61916	497187	1,3-Diaminourea	0
78222		Organic active ingredients (40 CFR455)	0
77081	144627	Oxalic acid	0
78237		Organics, volatile (NJAC reg. 7:23-17e)	0
78732		Volatile compounds, (GC/MS)	0

Table 5-3. Chemicals with no TWFs in *DMRLoads2007*

CAS Number	PRAM Code	Chemical Name	Total Pounds Released
79817	95772	3,4-Dichlorophenol	0
81328	25323302	Dichloroethene, total	0
82080		Trihalomethane, tot.	0
82602		Produced sand, weight	0
DDAC	7173515	Calgon H-130M	0
78171		Aromatics, total purgeable	0
51497		Spectrus OX 1200	0
32015		Base/neutral compounds	0
34103		Benzene, toluene, xylene in combination	0
34730	576249	2,3-Dichlorophenol, total	0
38925	13560899	Dechlorane plus	0
45670	84764	Dinonyl phthalate	0
49699		Betz slimicide C-31, total	0
49886	193700059	Betz clam-trol CT-2	0
77540	583788	2,5-Dichlorophenol	0
51132	108805	Cyanuric acid	0
77295	108430	3-Chlorophenol	0
51539		Nonpurgeable Organic Halides	0
51540		Purgeable Organic Halides	0
61026	4901513	2,3,4,5-Tetrachlorophenol	0
70015		Freon, total	0
76028		Base neutrals & acid (Method 625), efflnt	0
76029		Organics, tot purgeables (Method 624)	0
03768		Purgeable hydrocarbons, Meth. 601	0
51030		Spectrus CT 1300	0
Total			9,520,000,000

Source: *DMRLoads2007_v3*.

^a From the ZM Control Guide (Sprecher, 2000), Clam-Ttol CT-1 is a liquid substance that is 8 percent n-alkyl (C12-40 percent, C14-50 percent, C16-10 percent) dimethylbenzyl ammonium chloride and 5 percent dodecylguanidine hydrochloride.

^b Dock discharge of phosphorous is required for facilities that operate a ship dock used primarily for loading and unloading solids containing some compound of phosphorus (e.g., phosphate rock, ammoniated phosphates) (State of Louisiana, 2004).

TEC – Total equivalent concentration.

5.4 Toxic Weighting Factor References

1. Abt Associates Inc. 2008. Memorandum to Josh Hall, U.S. EPA. RE: Revised Draft – Updating the Boron TWF. Cambridge, MA. (December 5). EPA-HQ-OW-2008-0517 DCN 06729.

2. Sprecher, Susan, Kurt Getsinger. 2000. *Zebra Mussel Chemical Control Guide*. ERDC/EL TR-00-1. U.S. Army Engineer Research and Development Center. Vicksburg, MS. (January). EPA-HQ-OW-2004-0032-2171.
3. State of Louisiana Department of Environmental Quality (LA DEQ). 2004. NPDES Permit for IMC Phosphates Co, Faustina Plant. (May 24). EPA-HQ-OW-2004-0032-1134 and 1135.
4. U.S. EPA. 2005. *Draft Toxic Weighting Factor Development in Support of CWA 304(m) Planning Process*. Washington, DC. (June). EPA-HQ-OW-2004-0032-0857.
5. U.S. EPA. 2006. *Toxic Weighting Factor Development in Support of CWA 304(m) Planning Process*. Washington, DC. (June). EPA-HQ-OW-2004-0032-1634.

6. QUALITY REVIEW

EPA's screening-level analysis involves the collection and use of existing environmental data for purposes other than those for which they were originally collected. Pollutant Compliance System (PCS) and Integrated Compliance Information System for the National Pollutant Discharge Elimination System (ICIS-NPDES) were designed to automate entering, updating, and retrieving NPDES data and to track permit issuance, permit limits and monitoring data, and other data pertaining to facilities regulated under NPDES. The primary purpose of the Toxic Release Inventory (TRI) is to collect and make public annual data on releases and transfers of certain toxic chemicals from industrial facilities to inform communities and citizens of chemical hazards in their areas. Sections 2 and 3 of this report describe how EPA used the data in PCS, ICIS-NPDES, and TRI to calculate annual pollutant loadings to prioritize industrial category discharges for further review.

To use data in PCS and ICIS-NPDES, EPA first combined the two datasets to form *DMRLoads2007*, as described in Section 3. This section describes the quality review steps that EPA uses to determine if the *DMRLoads2007* and *TRIReleases2007* data are suitable for EPA's use in a screening-level analysis. The remainder of this section is divided into the following subsections:

- Section 6.1 – Overview of Quality Review Steps;
- Section 6.2 – Summary of *DMRLoads2007* Quality Review;
- Section 6.3 – Summary of *TRIReleases2007* Quality Review; and
- Section 6.4 – Quality Review References.

6.1 Overview of Quality Review Steps

EPA considered the following factors in its quality review of the PCS, ICIS-NPDES, and TRI data:

- Completeness. The following information is needed to analyze the toxic weighted pollutant loadings discharged by industrial categories:
 - Facility identity,
 - Industrial category under which the facility is regulated,
 - Identity of parameters discharged and corresponding toxic weighting factors (TWFs),
 - Mass of pollutants discharged (or pollutant concentration and discharge flow, from which the mass can be calculated), and
 - Understanding of how available information represents the discharger population and pollutant population.
- Accuracy. Analyzed data should accurately categorize and aggregate the underlying database.
- Reasonableness. Pollutant identities must be reasonably related to the operations in the category. Reported or calculated loads and facility wastewater flows should reflect the range of flows and loads known to exist in the United States.

The following subsections discuss each of these factors in more detail.

6.1.1 Completeness Checks

In previous years of review, EPA compared the number of facilities listed in the 2007 U.S. Economic Census to the number of facilities in the PCS and TRI databases, as described in the report entitled *2005 Annual Screening-Level Analysis: Supporting the Annual Review of Existing Effluent Limitations Guidelines and Standards and Identification of New Point Source Categories for Effluent Limitations Guidelines and Standards* to determine the extent to which the facilities in the databases represent the entire industry (U.S. EPA, 2005). In 2009 for categories selected for preliminary category review²¹, EPA compared the following statistics in *DMRLoads2007* and *TRIRelases2007* to the 2002 U.S. Economic Census: the total number of facilities, the number of facilities reporting wastewater discharges (direct or indirect) in TRI, and the number of major and minor facilities in DMR. Table 6-1 lists EPA's findings for the 2007 databases.

Table 6-1. Number of Facilities in Categories Selected for Preliminary Category Review

Point Source Category	NAICS Codes	2002 U.S. Economic Census	2007 DMR ^a	2007 TRI ^b
Fertilizer Manufacturing (40 CFR Part 418)	311225FER, 325312, 325311, 325314	>723	85	110
Inorganic Chemicals Manufacturing (40 CFR Part 415)	325120, 325131, 325181, 325188, 325998INORG, 331311, 325510INORG	>1,335	394	414
Nonferrous Metals Manufacturing (40 CFR Part 421)	325188NMM, 331312, 331314, 331411, 331419, 331423, 331492, 331521	>937	114	338
Ore Mining and Dressing (40 CFR Part 440)	21220, 212234, 212231, 212221, 212222, 212291, 212299, 213114	510	57	76
Organic Chemicals, Plastics and Synthetic Fibers (40 CFR Part 414)	311999OCPSF, 324199OCPSF, 325110, 325120OCPSF, 325132, 325188OCPSF, 325192, 325193, 325199, 325211, 325221, 325222, 325510OCPSF, 325520, 325611OCPSF, 325612, 325620, 325998, 326199OCPSF, 339999OCPSF, 424690, 562920	>17,125	903	2,032
Petroleum Refining (40 CFR Part 419)	324110, 324191, 324199, 325998PR, 474710, 486110	>5,785	1,393	780
Pulp, Paper and Paperboard (40 CFR Part 430)	321113-1, 322110, 322121, 322122, 322130, 322211, 322212, 322214, 322215, 322221, 322222, 322224, 322231, 322291, 322299	>4,876	448	464

Source: U.S. Economic Census, 2002 (U.S. Census, 2002), *TRIRelases2007_v2*, *DMRLoads2007_v3*.

a – Major and minor dischargers. Also, DMR data is reported by SIC code; therefore EPA used an NAICS to SIC crosswalk for comparison purposes.

b – Releases to any media.

²¹ See Section 5.3 of the *Technical Support Document for the Preliminary 2010 Effluent Guidelines Program Plan* (U.S. EPA, 2009) for information on how the categories were selected for preliminary category review.

EPA also considered the pollutant discharges that do not contribute to the category rankings. As discussed in Section 5, EPA identified and profiled the pollutant parameters that do not have an assigned TWF. Table D-1 in Appendix D lists the TWFs for those chemicals in the *DMRLoads2007* and *TRIReleases2007* databases for which EPA has developed TWFs. Table 5-2 and Table 5-3 list the chemicals in the databases that do not have assigned TWFs, as well as the total pounds of these pollutants estimated as discharged. This quality review showed that 52.6% of 18.1 billion pounds of pollutants discharged in *DMRLoads2007* are not currently assigned TWF, while 22.2% of 195 million pounds of pollutants released in *TRIReleases2007* are not currently assigned a TWF.

6.1.2 Accuracy Checks

EPA verified the accuracy of database queries used to analyze *DMRLoads2007* and *TRIReleases2007* data and generate output tables. As one team member created queries, a second team member reviewed the logic of the programming code, and compared the number of records in the output table to the number of records in intermediate queries. This ensured that no data were missing and that there were no duplicate records. EPA documented the quality checks in a database table that describes the function of each query created, the quality checks that were performed, the name of the reviewer, the date the query was reviewed, and any errors that were identified. Tables A-5 in Appendix A and B-15 in Appendix B present the quality check tables for the *TRIReleases2007* and *DMRLoads2007* databases.

6.1.3 Reasonableness Checks

EPA ranked pollutant discharges and facilities by toxic weighted loadings to identify discharges and loadings that are unusually high. EPA then conducted reasonableness checks on the unusually high pollutant discharges and facility loads to determine if the unusual values were misreported or miscalculated. The reasonableness checks are described in the following subsections.

6.1.3.1 Pollutant Identity

EPA ranked the pollutants discharged from each point source category and, using engineering understanding of industrial processes, verified that the pollutants composing the majority of the load could be reasonably related to operations in the industry. For unexpected results, EPA compared the reported releases to information in the facility's NPDES permit and other available resources, such as facility descriptions and discussions with the facility contacts. EPA corrected errors in *DMRLoads2007* and *TRIReleases2007* and documented the corrections. For example, in the quality review of the *TRIReleases2007* database, EPA identified a petroleum refining facility that was reporting dioxin discharges that resulted in a large discharge estimate, in terms of toxic weighted pound-equivalents (TWPE). EPA contacted the facility to verify that the estimated discharge was based on actual measured dioxin, instead of measurements below detection limits, because facilities often use non-detect values when estimating dioxin discharges. The facility verified that the reported discharges were actually an overestimate of their actual dioxin discharge, which follows EPA's guidance on TRI reporting²². This method is

²² The Office of Pollution Prevention and Toxic Substances provides guidance on how to report dioxin to TRI in the document entitled *Guidance for Reporting Toxic Chemicals within the Dioxin and Dioxin-like Compounds Category* (http://www.epa.gov/tri/guide_docs/index.htm#chemical_sp). "For purposes of threshold determinations and the

appropriate for TRI reporting purposes, but for the screening-level databases, EPA adjusted the estimated dioxin discharge to represent the actual dioxin measured in wastewater.

6.1.3.2 Facility Loads

EPA reviewed the toxic weighted loadings of facilities to ensure that they compose a reasonable percentage of the total national discharge. Facilities that compose a very high percentage of the national discharge have a large impact on the point source category rankings. EPA reviewed NPDES permit data or other available data to identify where a facility may have made a calculation error or reported the incorrect units of measure, and contacted facilities to confirm suspected errors. EPA corrected confirmed errors and documented the corrections. For example, in the quality review of the *DMRLoads2007* database, EPA identified a facility whose calculated TWPE for dioxin was over a billion pound-equivalents. EPA contacted the facility's regulatory authority and learned there were units errors as well as misinterpreted laboratory data. The units error caused *DMRLoads2007* to overestimate the dioxin load by a factor of 162 (Auchterlonie, 2009).

6.2 Quality Review of the DMRLoads2007 Database

As discussed in Section 3, to identify potential anomalous loads, EPA ranked *DMRLoads2007* facilities by total TWPE. For those facilities that ranked the highest for total TWPE, EPA reviewed them carefully to verify the accuracy of the database. The *DMRLoads2007* review included the following tasks:

- Comparison of *DMRLoads2007* to *PCSLoads2004*;
- Comparison of *DMRLoads2007* loads to *TRIReleases2007*;
- Review of flow and concentration data for units errors;
- Review of reported discharge data and the estimated load for missing data;
- Review of permit limits;
- Verification of proper SIC code/point source category classification;
- Review of NPDES permit or fact sheet where available; and
- Discussion with facility contacts.

These steps were taken for each facility that seemed to have an unusually high TWPE. Once a possible mistake was identified through the process listed above, EPA contacted the facilities for verification of changes made to the database. Table B-13 in Appendix B presents the resulting corrections identified.

reporting of releases and other waste management quantities for dioxin and dioxin-like compounds under EPCRA Section 313, either with monitoring data, or by using the emission factor approach, non-detects are treated as 'zero' if that is how the method being used treats non-detects (e.g., Method 1613, Method 23). However, facilities should use their best readily available information to report, so if a facility has better information than provided by these methods then that information should be used. For example, if a facility is not detecting dioxin or a particular dioxin-like compound using a particular method but has information that shows that they should be detecting them the facility should use this other information and it may be appropriate to estimate quantities using one half the detection limit." This guidance results in many facilities using one-half the detection limit to estimate discharges for years where no dioxin were detected in wastewater.

6.3 **Quality Review of the *TRIReleases2007* Database**

EPA ranked TRI facilities by total TWPE released to surface waters to identify potential anomalous loads. The review of *TRIReleases2007* included the following:

- Comparison of *TRIReleases2007* loads to *TRIReleases2006*;
- Comparison of *TRIReleases2007* loads to *DMRLoads2007*;
- Review of reported discharge data and the estimated load for missing data;
- Review of the basis of estimate used for reporting the pollutant discharge;
- Review of reported dioxin congener distributions;
- Verification of proper NAICS code/point source category classification;
- Discussions with facility contacts.

This review process was carried out for each facility that ranked among the highest for total TWPE released to surface waters or transferred to POTWs in 2007. Comparing databases and publically available discharge information made it possible to identify potential errors in the database, which would result in a high TWPE for a facility. Facilities were contacted to verify that the correct change to the data was taking place. Table A-3 in Appendix A presents the resulting corrections identified.

6.4 **Quality Review References**

1. Auchterlonie, Steve. 2009. Notes from Telephone Conversation between Chris Krejci, Eastern Research Group, Inc. and Steve Auchterlonie, Front St. Remedial Action. RE: Verification of Magnitude and Basis of Estimate for Dioxin and Dioxin-Like Compound Discharges in PCS. (March 13). EPA-HQ-OW-2008-517 DCN 06636.
2. U.S. Economic Census. 2002. Available online at: <http://www.census.gov/econ/census02>.
3. U.S. EPA. 2005. *2005 Annual Screening-Level Analysis: Supporting the Annual Review of Existing Effluent Limitations Guidelines and Standards and Identification of Potential New Categories for Effluent Limitations Guidelines and Standards*. EPA-821-B-05-003. Washington, DC. (August). EPA-HQ-OW-2004-0032-0901.

7. RESULTS OF 2009 SCREENING-LEVEL ANALYSIS

This section describes the results of the 2009 screening-level analysis and the methodology used by EPA to prioritize categories for further review. This section also discusses the identification of categories warranting detailed studies. The remainder of this section is divided into the following subsections:

- Section 7.1 – Preliminary Results of the Screening-Level Review;
- Section 7.2 – Prioritization of Categories; and
- Section 7.3 – Identification of Categories for Further Review.

7.1 Preliminary Results of the Screening-Level Review

The purpose of the screening-level review is to evaluate the amount and toxicity of the pollutants in an industrial category's discharges. Using *TRIReleases2007* and *DMRLoads2007*, EPA ranked point source categories according to their discharges of toxic and non-conventional pollutants (reported in units of toxic-weighted pound equivalent or TWPE). As described earlier in this report, EPA multiplied the pounds of pollutants discharged by toxic weighting factors (TWFs) resulting in an estimate of TWPE. Discharges were assigned to industrial categories on the basis of facility Standard Industrial Classification (SIC) and North American Industrial Classification System (NAICS) codes²³. Categories included both facilities subject to the existing effluent guidelines for the category and those belonging to potential new subcategories of existing effluent guidelines and to potential new categories.

Table 7-1 and Table 7-2 present, for categories for which EPA has promulgated effluent guidelines and pretreatment standards (ELGs), the preliminary rankings using *TRIReleases2007* and *DMRLoads2007*, respectively. Discharges from facilities that produce chlorine or chlorinated hydrocarbons (CCH) are listed on these tables as a separate category. See Section 7.2.1 for further discussion. Table 7-1 and Table 7-2 include discharges associated with facilities subject to the point source category applicability, as well as facilities that are associated with potential new subcategories of existing categories.

Table 7-1. *TRIReleases2007* Point Source Category Rankings

Rank	40 CFR Part	Point Source Category	TWPE
1	414.1	Chlorine And Chlorinated Hydrocarbons	7,270,000
2	414	Organic Chemicals, Plastics And Synthetic Fibers	575,000
3	423	Steam Electric Power Generating	542,000
4	430	Pulp, Paper And Paperboard	460,000
5	419	Petroleum Refining	172,000
6	420	Iron And Steel Manufacturing	104,000
7	433	Metal Finishing ^a	62,000

²³ DMR data from PCS and ICIS-NPDES in the *DMRLoads2007* has facility SIC codes, while TRI data has NAICS codes. See Section 5 – Identification of Point Source Categories for additional information on how EPA linked SIC and NAICS codes to point source categories.

Table 7-1. TRIReleases2007 Point Source Category Rankings

Rank	40 CFR Part	Point Source Category	TWPE
8	415	Inorganic Chemicals Manufacturing	54,700
9	440	Ore Mining And Dressing	44,400
10	421	Nonferrous Metals Manufacturing	38,900
11	432	Meat and Poultry Products	35,900
12	458	Carbon Black Manufacturing	32,400
13	455	Pesticide Chemicals	24,700
14	429	Timber Products Processing	16,300
15	417	Soap And Detergent Manufacturing	14,600
16	471	Nonferrous Metals Forming And Metal Powders	8,830
17	463	Plastics Molding And Forming	8,780
18	439	Pharmaceutical Manufacturing	8,000
19	428	Rubber Manufacturing	7,860
20	425	Leather Tanning And Finishing	7,800
21	469	Electrical And Electronic Components	7,550
22	NA	Miscellaneous Foods And Beverages	6,580
23	464	Metal Molding And Casting (Foundries)	6,110
24	468	Copper forming	4,950
25	NA	Tobacco Products	4,760
26	418	Fertilizer Manufacturing	4,460
27	437	Centralized Waste Treatment	3,790
28	413	Electroplating	3,210
29	407	Canned And Preserved Fruits And Vegetables Processing	2,960
30	467	Aluminum forming	2,710
31	436	Mineral Mining And Processing	2,420
32	405	Dairy products processing	2,400
33	410	Textile Mills	2,390
34	406	Grain mills	2,080
35	461	Battery Manufacturing	1,640
36	438	Metal Products And Machinery	917
37	426	Glass Manufacturing	546
38	434	Coal Mining	493
39	411	Cement Manufacturing	452
40	424	Ferroalloy Manufacturing	340
41	422	Phosphate Manufacturing	250
42	443	Paving And Roofing Materials (Tars And Asphalt)	249
43	465	Coil Coating	241
44	408	Canned And Preserved Seafood Processing	234
45	466	Porcelain Enameling	164

Table 7-1. TRIReleases2007 Point Source Category Rankings

Rank	40 CFR Part	Point Source Category	TWPE
46	446	Paint Formulating	140
47	NA	Printing And Publishing	110
48	445	Landfills	83
49	454	Gum And Wood Chemicals Manufacturing	55
50	444	Waste Combustors	40
51	NA	Independent And Stand Alone Labs	30
52	409	Sugar Processing	26
53	447	Ink Formulating	20
54	457	Explosives Manufacturing	14
55	406	Hospitals	1
56	NA	Drinking Water Treatment	0
TOTAL			9,550,000

Source: TRIReleases2007_v2.

NA – Not applicable. These are potential new categories.

Table 7-2. DMRLoads2007 Point Source Category Rankings

Rank	40 CFR Part	Point Source Category	Total TWPE
1	423	Steam Electric Power Generating ^a	20,400,000
2	433	Metal Finishing ^b	3,360,000
3	430	Pulp, Paper And Paperboard ^c	2,730,000
4	414.1	Chlorine And Chlorinated Hydrocarbons	1,220,000
5	418	Fertilizer Manufacturing	1,100,000
6	420	Iron And Steel Manufacturing	730,000
7	432	Meat and Poultry Products	536,000
8	414	Organic Chemicals, Plastics And Synthetic Fibers ^d	413,000
9	419	Petroleum Refining	403,000
10	415	Inorganic Chemicals Manufacturing	394,000
11	421	Nonferrous Metals Manufacturing	343,000
12	440	Ore Mining And Dressing	184,000
13	455	Pesticide Chemicals	180,000
14	NA	Drinking Water Treatment	119,000
15	471	Nonferrous Metals Forming And Metal Powders	119,000
16	410	Textile Mills	79,900
17	429	Timber Products Processing	51,600
18	417	Soap And Detergent Manufacturing	47,800
19	444	Waste Combustors	38,400
20	445	Landfills	35,800

Table 7-2. DMRLoads2007 Point Source Category Rankings

Rank	40 CFR Part	Point Source Category	Total TWPE
21	409	Sugar Processing	32,500
22	436	Mineral Mining And Processing	26,700
23	439	Pharmaceutical Manufacturing	24,900
24	463	Plastics Molding And Forming	24,600
25	422	Phosphate Manufacturing	18,500
26	467	Aluminum forming	12,200
27	464	Metal Molding And Casting (Foundries)	11,300
28	428	Rubber Manufacturing	11,200
29	454	Gum And Wood Chemicals Manufacturing	10,500
30	437	Centralized Waste Treatment	10,400
31	469	Electrical And Electronic Components	9,350
32	411	Cement Manufacturing	8,960
33	NA	Miscellaneous Foods And Beverages	5,840
34	NA	Independent And Stand Alone Labs	5,360
35	424	Ferroalloy Manufacturing	4,350
36	408	Canned And Preserved Seafood Processing	3,230
37	468	Copper forming	2,310
38	434	Coal Mining	2,290
39	406	Grain mills	1,980
40	407	Canned And Preserved Fruits And Vegetables Processing	1,760
41	443	Paving And Roofing Materials (Tars And Asphalt)	1,280
42	461	Battery Manufacturing	1,100
43	NA	Printing And Publishing	999
44	457	Explosives Manufacturing	785
45	412	CAFO	617
46	426	Glass Manufacturing	353
47	NA	Construction And Development	324
48	NA	Airport Deicing	265
49	435	Oil & Gas Extraction	256
50	465	Coil Coating	166
51	405	Dairy products processing	76
52	460	Hospital	15
53	466	Porcelain Enameling	11
54	425	Leather Tanning And Finishing	8
55	451	Concentrated Aquatic Animal Production	5
56	NA	Tobacco Products	3
57	438	Metal Products And Machinery	3
58	NA	Photo Processing	1

Table 7-2. DMRLoads2007 Point Source Category Rankings

Rank	40 CFR Part	Point Source Category	Total TWPE
59	459	Photographic	1
60	442	Transportation Equipment Cleaning	0
TOTAL			32,700,000

Source: *DMRLoads2007_v3*.

^a EPA corrected a suspected units error in *DMRLoads2007_v3* for FB Culley Station in Newburgh, IN (IN0002259) in the Steam Electric Power Generating Category. EPA attempted to contact the facility but the facility never returned calls. Therefore, EPA was unable to verify the correction.

^b EPA contacted General Electric in Erie, PA (PA0000183) in the Metal Finishing Category and identified a units error in *DMRLoads2007_v3* (Verderese, 2009). The new LBY and TWPE reported for this facility were recalculated and are now 0.024 and 2.790, respectively. The new Metal Finishing Category TWPE is 571,500.

^c For the Pulp, Paper, and Paperboard Category, EPA contacted facilities to verify the concentrations of dioxin and dioxin-like compounds in PCS and ICIS-NPDES. EPA found that, for all facilities contacted, there were either units errors (e.g., reported as ng/L but in the database as mg/L) or missing non-detect indicators. The new Pulp, Paper, and Paperboard Category total TWPE is 252,163. See Section 12.2.2.1 in the *Technical Support Document for the Preliminary 2010 Effluent Guidelines Program Plan* (U.S. EPA, 2009) for additional details on the facilities-specific corrections.

^d EPA contacted GE Silicones in Friendly, WV (WV0000094), in the OCPSF Category and identified a units error in *DMRLoads2007_v3* (Martin, 2009). The new LBY and TWPE reported for this facility were recalculated and are now 158 and 100.3, respectively. The new OCPSF Category total TWPE is 308,721.

NA – Not applicable. These are potential new categories.

7.2 Prioritization of Categories

For the 2009 screening-level review, EPA combined the results of the *TRIRelases2007* and the *DMRLoads2007* databases, which are presented in Sections 2 and 3 of this document, respectively. When combining the results of these databases, EPA made adjustments to the rankings for the following:

- Discharges from industrial categories for which EPA is currently developing or revising ELGs;
- Discharges from point source categories for which EPA has recently promulgated or revised ELGs; and
- Discharges from facilities determined not to be representative of their category.

Sections 7.2.1 through 7.2.4 discuss the rationale for these decisions. The final combined database rankings represent the results of the 2009 screening-level review and are presented in Section 7.2.5.

7.2.1 *Categories for Which EPA is Currently Developing or Revising ELGs*

EPA is currently considering revisions to ELGs for Organic Chemicals, Pesticides, and Synthetic Fibers (OCPSF) (40 CFR 414) and the Inorganic Chemicals Manufacturing (40 CFR 415) Point Source Categories for facilities that produce Chlorine and Chlorinated Hydrocarbons (CCH). Because the CCH rulemaking is underway, EPA excluded discharges from these facilities from further consideration under the current planning cycle. EPA subtracted the Toxic Weight Pollutant Equivalent (TWPE) loads from facilities that produce chlorine or chlorinated hydrocarbons from the Organic Chemicals, Pesticides, and Synthetic Fibers (OCPSF) and

Inorganic Chemicals Manufacturing Point Source Category loads. Because facilities that produce chlorine and chlorinated hydrocarbons are only a subset of the OCPSF and Inorganic Chemicals Manufacturing Categories, EPA included loads for all other facilities in these two categories in the prioritization of categories for further review²⁴.

7.2.2 Categories for Which EPA Recently Promulgated or Revised ELGs

For the 2009 annual review and development of category rankings, EPA excluded point source categories for which ELGs were recently established or revised but not yet fully implemented, or were recently reviewed in a rulemaking context where EPA decided to withdraw the proposal and select the “no action” option. In general, EPA removes a category from further consideration during a review cycle if EPA established, revised, or reviewed the category’s ELGs within seven years prior to the annual review. This seven-year period allows time for the ELGs to be incorporated into NPDES permits. For the 2009 annual review EPA excluded from the development of category rankings any categories with ELGs established, revised, or recently reviewed after August 2002. Table 7-3 lists these categories.

Removing a point source category from further consideration in the development of the rankings does not mean that EPA eliminates the category from annual review. In cases where EPA is aware of the growth of a new segment within such category, or where new concerns are identified for previously unevaluated pollutants discharged by facilities in the category, EPA would apply closer scrutiny to the discharges from the category in deciding whether to consider it further during the current review cycle. For example, EPA conducted the detailed study of the coal mining industry based on comments received on the 2006 Preliminary Plan, although the coal mining ELGs were revised in January 2002.

Table 7-3. Point Source Categories That Have Undergone a Recent Rulemaking or Review

40 CFR Part Number	Point Source Category	Date of Rulemaking
122 and 412	Concentrated Animal Feeding Operations (CAFOs)	November 20, 2008
451	Concentrated Aquatic Animal Production (or Aquaculture)	August 23, 2004
432	Meat and Poultry Products	September 8, 2004
413, 433, and 438	Metal Products and Machinery (including Metal Finishing and Electroplating)	May 13, 2003
420	Iron and Steel Manufacturing	October 17, 2002

Source: “Guidelines: Final, Proposed, and Under Development” at <http://www.epa.gov/waterscience/guide>.

7.2.3 Discharges Not Categorizable

EPA identified discharges that are not categorizable into new point source categories or subcategories. In particular, due to the high TWPE discharges EPA reviewed reported discharges from a Superfund site (Auchterlonie, 2009).²⁵ Direct discharges from Superfund sites, whether

²⁴ EPA is also currently revising the concentrated animal feeding operations ELG (Part 412); however, the TWPE associated with this category is low and does not affect the prioritization of categories based on TWPE. For more information on industries currently undergoing rulemakings, see <http://www.epa.gov/guide/industry.html>.

²⁵ The Comprehensive Environmental Response, Compensation, and Liability Act, commonly known as Superfund, was enacted by Congress on December 11, 1980.

made onsite or offsite, are subject to NPDES permitting requirements (U.S. EPA, 1988a; U.S. EPA, 1988b). For the reasons discussed below EPA determined that these discharges do not represent a point source category and excluded these TWPE from the point source category rankings.

EPA identified that discharges from Superfund sites are too varied to be categorized into a point source category. In particular, these discharges vary by:

- Contaminants (e.g., metals, pesticides, dioxin);
- Treatment technologies (e.g., air stripping, granular activated carbon, chemical/ultra-violet oxidation, aerobic biological reactors, chemical precipitation); and
- Types of facilities causing groundwater contamination (e.g., wood treatment facilities, metal finishing and electroplating facilities, drum recycling facilities, mine sites, mineral processing facilities, radium processing facilities).

Moreover, the duration and volume of these direct discharges vary significantly due to differences in aquifer characteristics and the magnitude, fate, and transport of contaminants in aquifers and vadose zones. Currently at Superfund sites, permit writers determine technology-based effluent limits using their best professional judgment (BPJ). EPA selects the remedial technology and derives numerical effluent discharge limits. The permit must also contain more stringent effluent limitations when required to comply with state water quality standards. EPA finds that the current site-specific BPJ approach is workable and flexible within the context of a Superfund cleanup.

7.2.4 Categories with One Facility Dominating the TWPE

EPA identified point source categories with significant TWPE where only one facility was responsible for most of the TWPE reported to be discharged (i.e., where one facility's TWPE accounted for more than 95 percent of the category TWPE, but was not the only facility reporting discharges for the category). Table 7-4 lists these categories. EPA identified 10 facilities that dominated the TWPE in the category to which they belonged. EPA investigated these facilities to determine if their discharges were representative of the category. If they were not, EPA subtracted the facility's TWPE from the total category TWPE and recalculated the category's ranking. EPA performed this analysis separately for both of the databases. Based on EPA's knowledge of these industries and the review of the pollutant discharges for these facilities, EPA determined that all of the pollutant discharges are representative of the industry and therefore, EPA did not remove the discharges from the category.

7.2.5 Combining the Final DMR and TRI Rankings

After adjusting the category TWPE totals and rankings as described in Sections 7.2.1 through 7.2.4, EPA consolidated the *DMRLoads2007* and *TRIRelases2007* rankings into one set using the following steps:

Table 7-4. Point Source Categories with One Facility Dominating the TWPE Discharges

Point Source Category	Facility with Over 95% of Category TWPE	Facility Location	Data Source	Pollutant Driving TWPE	Facility TWPE	Percent of Total Category TWPE	Action
Textile Mills (Part 410)	Deroyal Textiles	Camden, SC	DMR 2007	Aldrin	76,469	95.6%	Did not remove load from category TWPE
Independent and Stand Alone Labs (Potential New Category)	Brookhaven National Laboratory	Upton, NY	DMR 2007	PCBs	5,166	96.5%	Did not remove load from category TWPE
Canned and Preserved Seafood Processing (Part 408)	Campbell Soup Company	Napoleon, OH	DMR 2007	Hexavalent Chromium	3,123	96.6%	Did not remove load from category TWPE
Plastics Molding and Forming (Part 463)	Innovia Films, Inc	Topeka, KS	DMR 2007	Carbon Disulfide	24,219	98.3%	Did not remove load from category TWPE
Timber Products Processing (Part 429)	Stimson Lumber Co Bonner Mill	Bonner, MT	DMR 2007	Chlorine	51,374	99.7%	Did not remove load from category TWPE
Soap and Detergent Manufacturing (Part 417)	Stepan Company-Elwood	Elwood, IL	DMR 2007	Hexachlorobenzene	47,795	99.96%	Did not remove load from category TWPE
Ferroalloy Manufacturing (Part 424)	Eramet Marietta Inc	Marietta, OH	DMR 2007	Cadmium	4,349	99.99%	Did not remove load from category TWPE
Construction and Development (Potential New Category)	Aeroquip - Vickers	Joplin, MO	DMR 2007	Cadmium	324	99.99%	Did not remove load from category TWPE
Soap and Detergent Manufacturing (Part 417)	Crodia Inc	New Castle, DE	TRI 2007	Bis(2-chloroethyl) Ether	14,453	99.1%	Did not remove load from category TWPE
Tobacco Products (Potential New Category)	Philip Morris Park 500 Site	Chester, VA	TRI 2007	Chlorine	4,730	99.4%	Did not remove load from category TWPE

Source: *TRIRelases2007_v2*; *DMRLoads2007_v3*.

- EPA combined the two lists of point source categories by adding each category's *DMRLoads2007* TWPE and *TRIRelases2007* TWPE²⁶.
- EPA then ranked the point source categories based on total *DMRLoads2007* and *TRIRelases2007* TWPE.

Table 7-5 presents the combined *DMRLoads2007* and *TRIRelases2007* rankings. These are the final category rankings accounting for all corrections made to the databases during the 2009 screening-level review and removal of any categories and discharges as discussed in Sections 7.2.1 through 7.2.4.

7.3 Identification of Categories With Existing Effluent Guidelines for Further Review

After completing the development of the prioritized list, shown in Table 7-5, EPA selected for further review the point source categories that cumulatively discharge 95 percent of the total *DMRLoads2007* and *TRIRelases2007* TWPE. The cutoff point is shown as a bold line in Table 7-5.

EPA performed detailed studies on three point source categories as part of its 2009 annual review based on the results of its 2007 and 2008 annual reviews. Because EPA data collection was not finished in 2008, EPA continued detailed studies of the Steam Electric Generating Category (Part 423), Oil and Gas Extraction (Part 435) (to assess whether to revise the limits to include coalbed methane extraction as a new subcategory), and the Health Care Industry (includes Hospitals (Part 460)). EPA did not identify additional categories for detailed study as part of the 2009 annual review.

EPA's detailed studies generally examine the following: (1) wastewater characteristics and pollutant sources; (2) the pollutants driving the toxic-weighted pollutant discharges; (3) availability of pollution prevention and treatment; (4) the geographic distribution of facilities in the industry; (5) any pollutant discharge trends within the industry; and (6) any relevant economic factors. First, EPA attempts to verify the screening-level results and fill in data gaps. Next, EPA considers costs and performance of applicable and demonstrated control technology, process change, or pollution prevention alternatives that can effectively reduce the pollutants remaining in the industrial category's wastewater. Last, EPA considers the affordability or economic achievability of the technology, process change, or pollution prevention measures identified above.

Types of data sources that EPA may consult in conducting its detailed studies include, but are not limited to: (1) the U.S. Economic Census; (2) TRI, PCS, and ICIS-NPDES data; (3) trade associations and reporting facilities to verify reported releases and facility categorization; (4) regulatory authorities (states and EPA regions) to understand how category facilities are permitted; (5) NPDES permits and their supporting fact sheets; (6) EPA effluent guidelines technical development documents; (7) relevant EPA preliminary data summaries or study reports; and (8) technical literature on pollutant sources and control technologies.

²⁶ EPA notes that this may result in "double-counting" of chemicals a facility reported to both PCS/ICIS-NPDES and TRI, and "single-counting" of chemicals reported in only one of the databases. The combined databases do not count chemicals that may be discharged but are not reported to PCS/ICIS-NPDES or TRI.

Table 7-5. Final *DMRLoads2007* and *TRIReloads2007* Combined Point Source Category Rankings

40 CFR Part	Point Source Category	<i>DMRLoads2007</i> TWPE	<i>TRIReloads2007</i> TWPE	Total TWPE	Cumulative Percent of Total TWPE	Rank
423	Steam Electric Power Generating	20,374,829 ^a	541,508	20,916,337	72.64	1
430	Pulp, Paper And Paperboard	2,726,865 ^b	459,959	3,186,823 ^b	83.71	2
418	Fertilizer Manufacturing	1,095,046	4,462	1,099,509	87.53	3
414	Organic Chemicals, Plastics And Synthetic Fibers	413,226 ^c	574,742	987,968 ^c	90.96	4
419	Petroleum Refining	402,506	171,756	574,262	92.96	5
415	Inorganic Chemicals Manufacturing	393,523	54,657	448,181	94.51	6
421	Nonferrous Metals Manufacturing	342,747	38,885	381,632	95.84	7
440	Ore Mining And Dressing	184,455	44,437	228,892	96.63	8
455	Pesticide Chemicals	180,117	24,693	204,810	97.35	9
471	Nonferrous Metals Forming And Metal Powders	119,244	8,834	128,077	97.79	10
410	Textile Mills	79,934	2,389	82,323	98.08	11
429	Timber Products Processing	51,552	16,301	67,852	98.31	12
417	Soap And Detergent Manufacturing	47,815	14,585	62,401	98.53	13
444	Waste Combustors	38,412	40	38,451	98.66	14
445	Landfills	35,804	83	35,887	98.79	15
463	Plastics Molding And Forming	24,626	8,781	33,407	98.90	16
439	Pharmaceutical Manufacturing	24,937	7,996	32,934	99.02	17
409	Sugar Processing	32,520	26	32,545	99.13	18
458	Carbon Black Manufacturing		32,375	32,375	99.24	19
436	Mineral Mining And Processing	26,719	2,416	29,135	99.34	20
428	Rubber Manufacturing	11,195	7,864	19,059	99.41	21
422	Phosphate Manufacturing	18,459	250	18,709	99.47	22
464	Metal Molding And Casting (Foundries)	11,271	6,115	17,386	99.54	23
469	Electrical And Electronic Components	9,350	7,551	16,902	99.59	24
467	Aluminum forming	12,182	2,707	14,889	99.65	25
437	Centralized Waste Treatment	10,403	3,785	14,189	99.69	26

Table 7-5. Final *DMRLoads2007* and *TRIReloads2007* Combined Point Source Category Rankings

40 CFR Part	Point Source Category	<i>DMRLoads2007</i> TWPE	<i>TRIReloads2007</i> TWPE	Total TWPE	Cumulative Percent of Total TWPE	Rank
NA	Miscellaneous Foods And Beverages	5,842	6,576	12,418	99.74	27
454	Gum And Wood Chemicals Manufacturing	10,478	55	10,532	99.77	28
411	Cement Manufacturing	8,960	452	9,412	99.81	29
425	Leather Tanning And Finishing	8	7,802	7,809	99.83	30
468	Copper forming	2,310	4,951	7,261	99.86	31
NA	Independent And Stand Alone Labs	5,355	30	5,385	99.88	32
NA	Tobacco Products	3	4,756	4,759	99.89	33
407	Canned And Preserved Fruits And Vegetables Processing	1,757	2,960	4,717	99.91	34
424	Ferroalloy Manufacturing	4,349	340	4,689	99.93	35
406	Grain mills	1,984	2,084	4,068	99.94	36
408	Canned And Preserved Seafood Processing	3,232	234	3,467	99.95	37
434	Coal Mining	2,294	493	2,787	99.96	38
461	Battery Manufacturing	1,096	1,642	2,738	99.97	39
405	Dairy products processing	76	2,402	2,479	99.98	40
443	Paving And Roofing Materials (Tars And Asphalt)	1,280	249	1,529	99.99	41
NA	Printing & Publishing	999	110	1,109	99.99	42
426	Glass Manufacturing	353	546	899	99.99	43
457	Explosives Manufacturing	785	14	798	100.00	44
465	Coil Coating	166	241	407	100.00	45
435	Oil & Gas Extraction	256		256	100.00	46
466	Porcelain Enameling	11	164	175	100.00	47
446	Paint Formulating		140	140	100.00	48
447	Ink Formulating		20	20	100.00	49
460	Hospital	15		15	100.00	50
NA	Photo Processing	1		1	100.00	51

Table 7-5. Final *DMRLoads2007* and *TRIReleases2007* Combined Point Source Category Rankings

40 CFR Part	Point Source Category	<i>DMRLoads2007</i> TWPE	<i>TRIReleases2007</i> TWPE	Total TWPE	Cumulative Percent of Total TWPE	Rank
459	Photographic	1		1	100.00	52
442	Transportation Equipment Cleaning	0		0	100.00	53
	Total	26,719,348	2,073,457	28,792,806		

Source: *TRIReleases2007_v2*; *DMRLoads2007_v3*.

^a EPA corrected a suspected units error in *DMRLoads2007_v3* for FB Culley Station in Newburgh, IN (IN0002259) in the Steam Electric Power Generating Category. EPA attempted to contact the facility but the facility never returned calls. Therefore, EPA was unable to verify the correction.

^b For the Pulp, Paper, and Paperboard Category, EPA contacted facilities to verify the concentrations of dioxin and dioxin-like compounds in PCS and ICIS-NPDES. EPA found that, for all facilities contacted, there were either units errors (e.g., reported as ng/L but in the database as mg/L) or missing non-detect indicators. The new Pulp, Paper, and Paperboard Category total DMR TWPE is 252,163, while the new DMR and TRI combined total TWPE is 712,122. See Section 12.2.2.1 in the *Technical Support Document for the Preliminary 2010 Effluent Guidelines Program Plan* (U.S. EPA, 2009) for additional details on the facilities-specific corrections.

^d EPA contacted GE Silicones in Friendly, WV (WV0000094), in the OCPSF Category and identified a units error in *DMRLoads2007_v3* (Martin, 2009). The new LBY and TWPE reported for this facility were recalculated and are now 158 and 100.3, respectively. The new OCPSF Category total DMR TWPE is 308,721, while the new DMR and TRI combined total TWPE is 883,463.

NA – Not applicable; no existing ELGs apply to discharges.

Preliminary category reviews are similar to detailed studies and have the same purpose. During preliminary reviews, EPA generally examines the same items listed above for detailed studies. However, EPA's preliminary review of a category and available pollution prevention and treatment options is less rigorous than its detailed studies. While EPA collects and analyzes hazard and technology-based information on categories undergoing preliminary review, it assigns a higher priority to investigating categories undergoing detailed studies.

EPA identified for preliminary review those industrial categories currently regulated by existing effluent guidelines that cumulatively compose more than 95 percent of the combined *DMRLoads2007* and *TRIRelases2007* total TWPE. EPA also reviewed the Ore Mining and Dressing Category (40 CFR Part 440) because during previous annual reviews, EPA has concluded that there are not sufficient data available to determine whether wastewater discharges from the Ore Mining and Dressing Category warrant a detailed study. In addition to the Steam Electric Power Generating Category this list includes the following point source categories:

- Fertilizer Manufacturing;
- Inorganic Chemicals Manufacturing;
- Nonferrous Metals Manufacturing;
- Ore Mining and Dressing;
- Organic Chemicals, Plastics, and Synthetic Fibers;
- Petroleum Refining; and
- Pulp, Paper and Paperboard.

EPA recently conducted detailed studies or preliminary reviews of many of the categories listed above. For each of these categories, because EPA's annual review builds on previous reviews, EPA primarily looked at the pollutants reported in 2007 and their contribution to their category's TWPE.

After considering the results of the studies and preliminary category reviews, EPA will determine whether further study or development or revision of an effluent guideline is appropriate. Final determinations will be presented in the 2010 Effluent Guidelines Plan.

7.4 Results of 2009 Screening-Level Analysis References

1. Davis, Katherine. 2009. Notes from Telephone Conversation between Elizabeth Sabol, Eastern Research Group, Inc. and Katherine Davis, Westvaco Texas, L.P. RE: Basis of TCDD Equivalent Concentrations Reported in 2007. (July 7). EPA-HQ-OW-2008-0517 DCN 06547.
2. Martin, Jason. 2009. Notes from Telephone Conversation between Elizabeth Sabol, Eastern Research Group, Inc. and Jason Martin, MPM Silicones LLC. RE: Basis of Copper (Total Recoverable) Concentrations Reported in 2007. (July 1). EPA-HQ-OW-2008-0517 DCN 06549.
3. McCutchen, Kate. 2009. Notes from Telephone Conversation between Elizabeth Sabol, Eastern Research Group, Inc. and Kate McCutchen, Blue Heron Paper Co. RE: Basis of Methylmercury Concentration Reported in 2007 in DMR. (July). EPA-HQ-OW-2008-0517 DCN 06546.

4. Verderese, Jim. 2009. Notes from Telephone Conversation between Elizabeth Sabol, Eastern Research Group, Inc. and Jim Verderese, General Electric Erie. RE: Basis of Mercury Concentration Reported in December 2007 in DMR. (July 1). EPA-HQ-OW-2008-0517 DCN 06548.
5. U.S. EPA. 2009. *Technical Support Document for the Preliminary 2010 Effluent Guidelines Program Plan*. EPA-821-R-09-006. Washington, DC. (October). EPA-HQ-OW-2007-0571 DCN 06703.